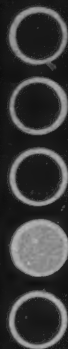


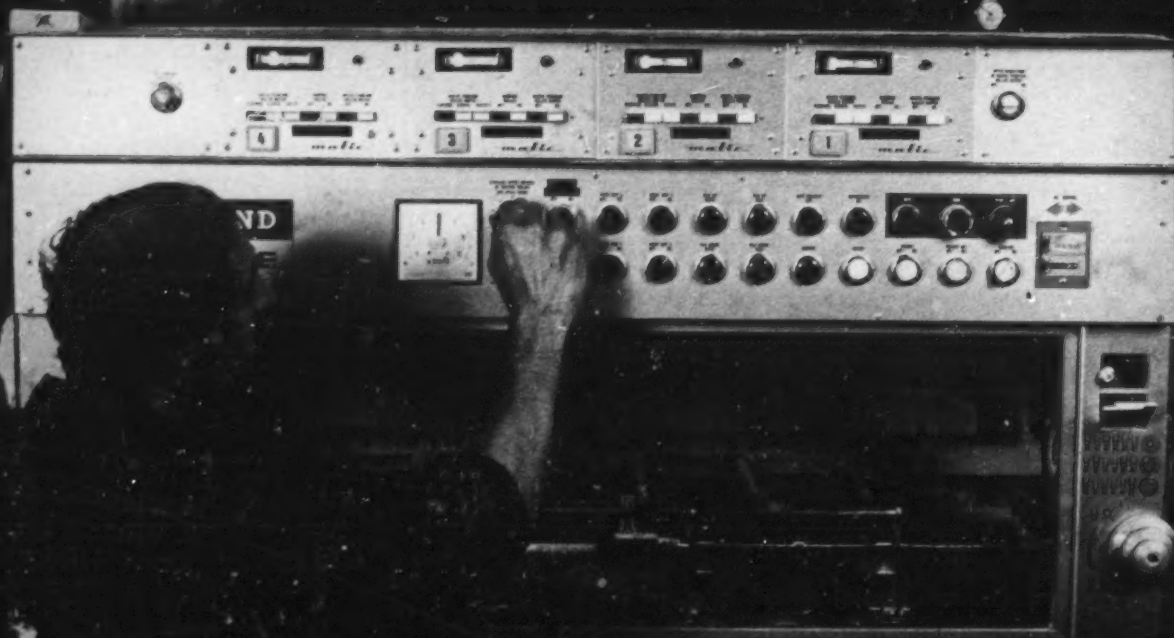
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11/12/82

November 1982



paper board packaging



**Developments in
Printing Processes**

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vol 67 no. 11

November 1982

HBJ A HARCOURT BRACE JOVANOVIH PUBLICATION



on the cover

This month *Paperboard Packaging* takes a look at recent printing and press developments in the industry. Photo by Jeff Frey.

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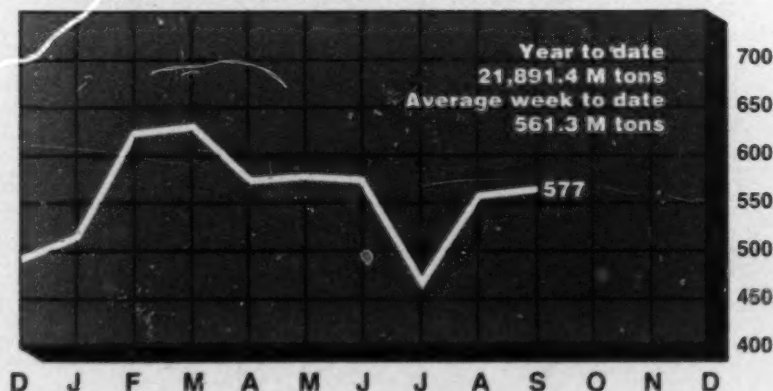
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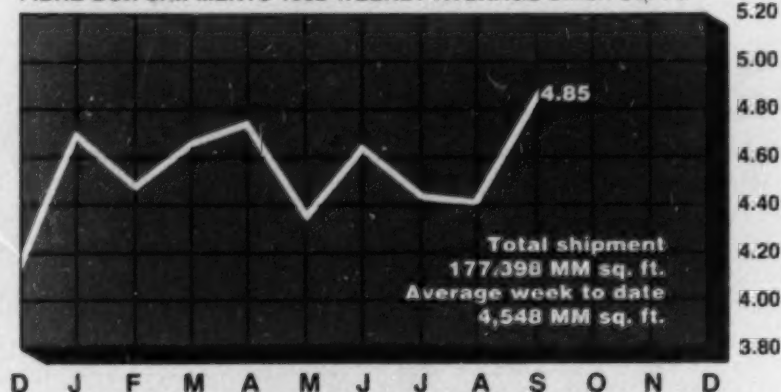
PAPERBOARD PRODUCTION 1982-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

The first three quarters of 1982 concluded with average-week board output 9.2% below same-period 1981 tonnage, compared with a 3.8% rise in '81 from '80, a 1% drop in '80 from '79, and a 3.3% rise in '79 from '78. However, the third quarter itself produced an 11% slump from '81, with drops of 12.3% in unbleached kraft furnishes, 13% in semichemical, 8.3% in solid bleached, and 7.8% in recycled. These sharp declines in the containerboard grades—more than double the drop in fibre box shipments—reveals the sad state of export markets.

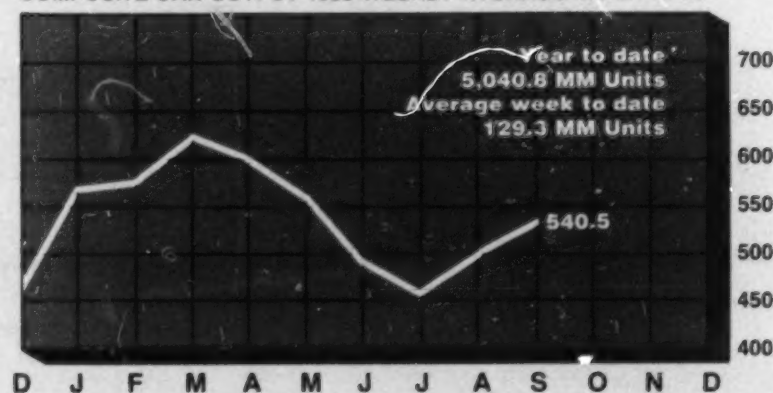
FIBRE BOX SHIPMENTS 1982-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In September, 2472.5 M total tons of output—down 0.8% from '82—appeared as 1812.1 M of containerboard grades—down 1.7%—and 660.4 M of boxboards—up 2%—according to projections from the American Paper Institute's "production by furnish" data. This 2.75-to-1 tonnage ratio compares most unfavorably with the traditional 2-to-1 of more normal economic times. It would substantiate informal reports of double-digit drops in volume of packagings made from the boxboard grades, but no longer reported publicly by compilers.

COMPOSITE CAN OUTPUT 1982-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Three quarters of the way through 1982, major set-up boxmakers report a drop of some 9% in total billings from '81, compared with increases of 10% in '81 over '80, 6% in '80 over '79, and 8.7% in '79 over '78. The general reduction in money available for non-essentials is clearly having a strong effect on the rigid box—normally associated with much "luxury" packaging. The toehold of geography continues also, with highly industrialized (and thus high-unemployment) regions affected very strongly, compared with relatively mild fall-offs elsewhere.

paper board packaging

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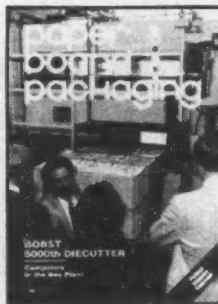
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Pullout
Industry
Calendar

vol 67 no. 12

December 1982

(HBJ) A HARDCOURT BRACE JOVANOVICH PUBLICATION



on the cover

Bobst recently celebrated the sale of its 5000th Autoplaten® Diecutter to Simkins Industries, Inc., New Haven, Ct. Paperboard Packaging went to New Haven to witness a truly historic event. Story begins on page 18. Cover photo from Fletcher-Walker-Gessell, Inc.

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- 5000th Autoplaten® Diecutter Installed
at Simkins Industries 18**
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- Computers Taking Command
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by Steven C. Kish



- British Flexo Press
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continued growth at Shaw Packaging, Inc.

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Approaching Corrugated From a Different Angle 70

A corrugated dome? A mechanical engineer discusses a corrugated dome he designed to be used for temporary shelter or storage.

by Ed Sniderman



Cartonboard, Plastics & Foil to Unite for the Ideal Package? 72

Right now its a rocky relationship, but marriage may be right around the corner—the combination of cartonboard, plastics and foil for the ultimate package.

by P.B. Murphy

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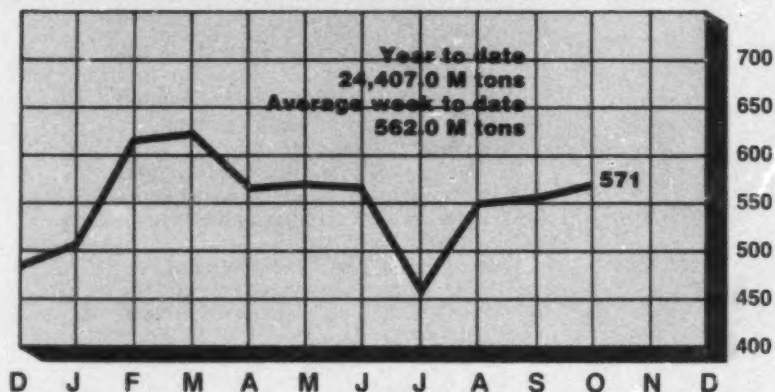
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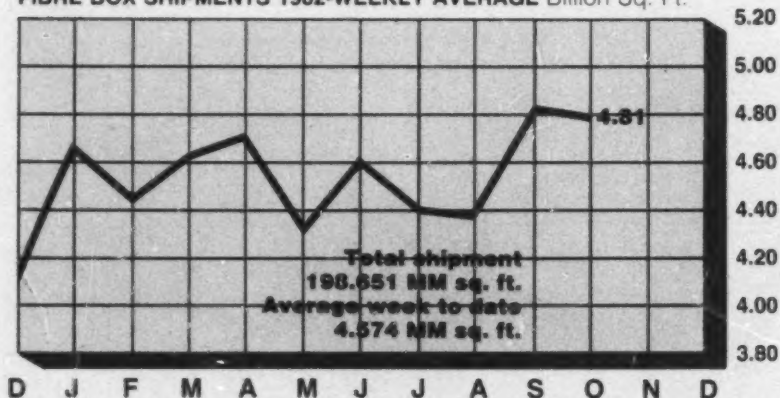
PAPERBOARD PRODUCTION 1982-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

The first ten months of 1982 ended with total average-week board volume down 9% from last year, compared with a 3.4% rise in 1981 from '80, which was 1.2% down from '79, which had been 3.5% up from '78. October-end tonnage in '81 was history's highest. However, this recession began with that fourth quarter, and the year's final volume fell below the 1979 record high. Now, two factors are narrowing the tonnage decline from last year. One is the comparison with a recession late-month '81. The other is widening box-plant strikes in east Canada, with many across-border orders improving our board consumption.

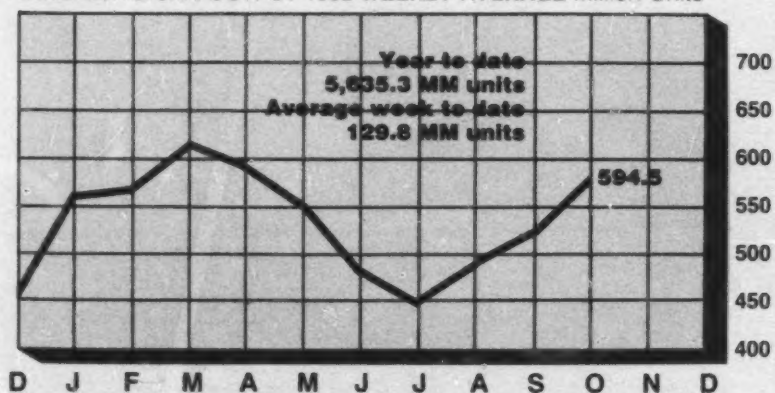
FIBRE BOX SHIPMENTS 1982-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In October, 2526.8 M tons of board output (down 5% from '81) comprised 1852.1 M of containerboards (down 6.4%) and 674.7 M of boxboards (down 1.4%), as projected from the American Paper Institute's "production by furnish" data. This relative rise in boxboard volume follows a nine-month stagnation in which the containerboards, though weak themselves, had reached a distorted tonnage ratio of nearly 3-to-1. October provided the best average-week boxboard production of this year, possibly presaging an upturn in markets for retail commodities.

COMPOSITE CAN OUTPUT 1982-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Set-up box billings, more than 7% below the 1981 level, continue to reflect the general industry downturn. However, this record, as reported by about 100 major producers, reflects an average of the nation's most remarkable geographic variations. Business for the year ranges from modest improvements in Midwest and Southern sectors to double-digit drops in the Northeast. Some portion of the advances may be due to higher unit prices, similar to those of the average shipped ton of folding cartons, which continues to improve by around 10%-12% per year.

paper board packaging

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1983
Buying
Forecast

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vol 68 no. 1

January 1983

HRJ A HARCOURT BRACE JOVANOVIĆ PUBLICATION



on the cover

Paperboard Packaging looks down the road to forecast equipment buying trends and what's in store for the corrugated, folding carton and rigid box industries in 1983. Forecast starts on page 18. Cover design by Mary Hessing. Cover photograph by Dick Brockman.

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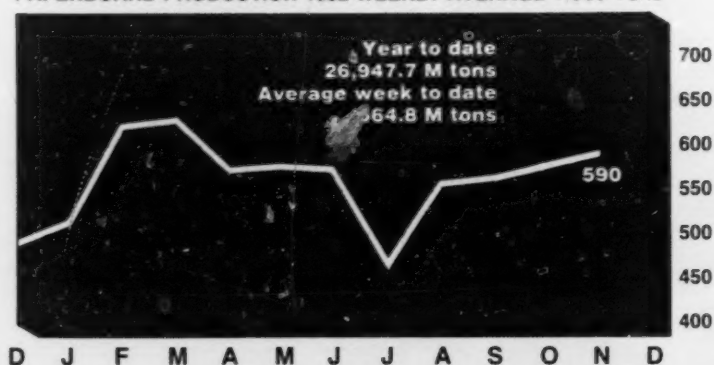
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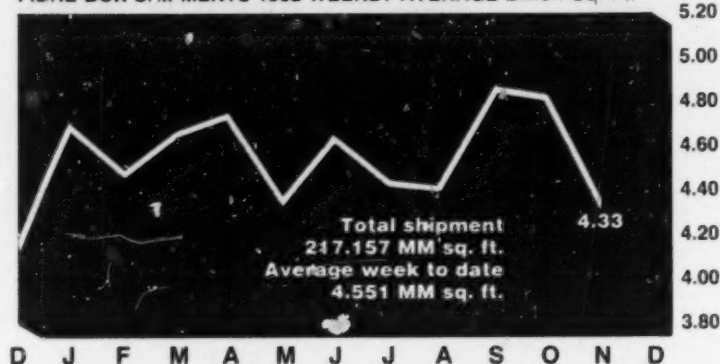
PAPERBOARD PRODUCTION 1982-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

With a single month of 1982 remaining, total average week paperboard output was 7.9% below '81, compared with a rise last year of 3% from '80, a drop of 1.9% in '80 from '79, and a rise in '79 of 3.5% from '78. Average week tonnage at November-end is the lowest since 1977. The '82 record includes a reduction of 8.8% in container-boards and of 6.9% in boxboards. The latter grades, of course, had less far to fall, having been in a relatively dismal state for some years. Some small upturn has appeared in latest months; the extent is not evident.

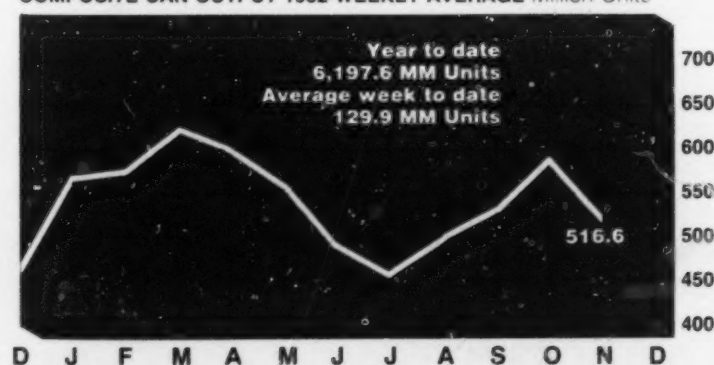
FIBRE BOX SHIPMENTS 1982-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In November, 1856.3 M tons of containerboards (up 1.4% from '81!) and 670.9 M of boxboards (down 1%) combined for a 1% overall rise, as projected from the American Paper Institute's "production by furnish" data. One effect of this late-year trend is that the c'board/boxboard ratio is turning toward the traditional 2-to-1 from the near 3-to-1 approached earlier. However, this does not presage any long-term improvement in boxboard fortunes, since at November end their tonnage was the lowest since 1973.

COMPOSITE CAN OUTPUT 1982-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Through the first 11 months of 1982, set-up box producers reported a decline of some 7% from last year's grand total billings, though with decreasing margins as 1981 business slackened in the later months. Only two of the eight National Paperbox & Packaging area divisions remained above the billings of 1981, with the "minuses" no longer restricted to the beset Midwest automotive sectors. The good news is that average value per shipped ton is up 9% in the year; the bad news is that even this gain has barely kept up with inflation.

1983 Buying Forecast

*Only a few rays of sunshine
will break through dark economic clouds.*

What do converters in the corrugated and solid fiber sectors have to look forward to in 1983? We wish we could paint a rosy picture filled with words like "upturn," "increases," and "gains," but although such talk could very well start creeping into our vocabulary six months from now, to use them at the start of this new year would only be blowing so much hot air.

A year ago at this time we were predicting an upturn in the latter half of 1982. Needless to say, even the personal tax cut last July did not help the economy turn around. The

key question that everyone has been asking is: What is delaying the recovery?

According to Lawrence Chemerine of Chase Econometrics, a number of factors are to blame. First, companies are still trying to bring down their labor (and other) costs to restore profitability and compete effectively. Second, consumers are showing few signs of wanting to open their wallets and purses on a consistent basis. The *Wall Street Journal* summed this sentiment up nicely in a recent article headlined, "Fearing Loss of Jobs, Many Consumers Cut Pur-

chases, Save More." Even though the average household is in relatively strong financial shape (real income rose 2% in the past 16 months and installment debt as a percentage of disposable income is at a 10-year low) pessimistic consumers are just not likely to go on the kind of spending spree that has lifted the economy out of past recessions. That,

What the cloud of uncertainty hanging over the industry means for boxmakers can be summed up in two words: fierce competition.

Unfortunately, is going to come about slowly in 1983.

Finally, both households and businesses are not reacting quickly to declines in nominal interest rates. Why? Because these rates, after adjustment for inflation, remain high.

Reasons for optimism

Nevertheless, there are good reasons for optimism in the converting industry this year. Probably the most significant one is the news that after four years of steady declines, the housing industry is gearing for a modest recovery due to an interest rate decline of more than four percentage points since mid-July. Although it remains to be seen if housing will be leading the parade out of the recession, this is encouraging news to converters since the materials involved in building a house need packaging.

What the cloud of uncertainty hanging over the industry means for boxmakers can be summed up in two words: fierce competition. There will be competition in sales, marketing strategy, production levels, services offered, and package design, among other things. Folding carton and corrugated box plants are closing faster than they are opening and we don't see this trend suddenly reversing itself in 1983. Those in charge at integrated and independent plants alike will continue to be forced to make some very hard decisions in the next 12 months and beyond. International Paper's profit margins were reduced in the third quarter of 1982 because of "very competitive pricing in all product lines," according to Edwin A. Gee, chairman and chief executive officer.

The boxmaking industry is in bet-

ter shape than the auto and steel industries. Historically, orders and shipments of corrugated and solid fiber boxes have closely tracked Gross National Product (GNP) and we see the GNP increasing by one to two percent in 1983 after adjusting for inflation. It has been said before but it bears repeating again: The pie has not (and will not) get any bigger. In 1983 boxmakers just can not afford to take the needs of their current customers for granted. They must listen carefully and (if they don't know already) they must learn the importance of specialization and diversification of their product line. The computer age has clearly arrived in our industry and boxmakers who ignore this and don't take the time to look five or even ten years down the road will eventually pay a hefty price.

In talking to those executives with equipment purchasing power, a number note that they have not bought new equipment in years. Yet, simultaneously, they quickly point out that once they see a steady flow of positive economic signs, funds that had been slowly accumulating will slowly be spent on improving and buying new converting equipment. The latter part of this year will see the beginning of this extremely encouraging development.

Corrugated Boxmakers Face Tough Decisions in '83

Converters must distinguish between beneficial cost-cutting and plain distress.

Paperboard Packaging does not see 1983 being much different from 1982. Whether one looks at industry shipments of corrugated and solid fiber products, consumption of containerboard or inventory of

This '83 Forecast was written by Mark Arzoumanian, editor; Fred Sharring, senior editor; and Norm Baldwin, executive director, N.P. & P.A.

containerboard in both box plants and mills, a consistent downward trend prevails. To give one example, shipments in the third quarter in 1982 were 4.9% lower than the same quarter in 1981, according to the Fibre Box Association.

During 1982 the level of corrugated and solid fiber shipments totaled an estimated 240 billion sq ft. In 1981 this figure was 246 billion sq ft, which amounts to a 3% drop between '81 and '82. Shipments in 1983 should equal or slightly surpass those in 1981.

Paperboard Packaging estimates a 1983 sales volume of \$11.3 billion (in today's dollars).

Encouraging news can be found in the gradual decrease in containerboard inventories during 1982, which went from a 9.4 week supply in January to less than a seven week supply by year's end, according to the Bureau of Industrial Economics. The latter is traditionally where inventory supply weeks in the industry have hovered. If packaging demand is going to pick up this year, these figures must stabilize at six to 6.5 week levels.

Continued computerization

Trends that will continue to have a marked impact on the corrugated industry include the steady growth (from 1960 to 1982: 5.4% to around 9%) of doublewall and triplewall boxes, mainly due to strength and reusability (although singlewall boxes still account for around 91% of the industry's annual container sales); a rise in the number of small sheet plants; continued computerization of the box plant (see last month's article by Steven Kish of Ward Machinery Co. on this subject); using corrugated board with such flexible packaging materials as plastics and film (a trend that is well developed in Europe); and the increased use of protective corrugated sheets made of fluted and laminated paperboard.

Another very hot subject that a lot of people are buzzing about and gathering information on is pre-printed linerboard. According to a knowledgeable industry source directly involved in this topic there were no technological changes in 1982 but a "quantum jump in the awareness of the technology currently available."

"Now large integrated plants and
(continued on page 22)

Paperboard Packaging / January 1983 / 19

For more information on International Paper Box Machine Co. Circle No. 126 on Reader Inquiry Card ➔

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Corrugated and Solid Fiber Boxes (SIC 2653): Trends and Projections 1972-83

(in millions of dollars except as noted)

Item	1972	1977	1979	1980	1982 ¹	1982 ²	Compound annual rate of growth 1972-82	1983 ³	Percent change 1982-83 ³
Industry data									
Value of shipments ⁴	4,308.8	7,351.1	8,975.9	9,650.5	10,663.8	10,983.7	—	—	—
Value of shipments (1972 \$) ⁴	4,308.8	4,619.0	5,094.8	4,906.3	5,004.4	4,855.0	+1.2	5,000.0	+3.0
Total employment (000)	107.9	101.5	103.7	97.2	96.4	92.0	1.6	96.0	+4.3
Production workers (000)	80.6	73.5	75.5	69.4	68.9	65.3	-2.1	68.3	+4.6
Average hourly earnings of production workers (\$)	3.88	5.92	6.91	7.59	8.29	9.07	+8.9	—	—
Capital expenditures	101.5	243.3	303.0	432.8	—	—	—	—	—
Product data									
Value of shipments ⁴	4,196.9	7,182.8	8,686.9	9,363.5	10,346.7	10,657.1	—	—	—
Value of shipments (1972 \$) ⁴	4,196.9	4,499.1	4,962.5	4,778.9	4,874.5	4,728.3	+1.2	4,870.1	+3.0
Product price index (1972 = 100)	100.0	146.4	173.1	194.6	211.1	223.8	—	—	—
Quantity shipped (unit of measure)	211.9	227.2	250.6	244.4	246.2	238.8	+1.2	246.0	+3.0
Trade									
Value of exports	8.3	34.0	49.0	54.7	64.4	57.5	—	61.5	+7.0
Export shipments ratio	0.002 ⁵	0.005	0.006	0.006	0.006	0.005	—	—	—

¹ Estimated except for product price index, exports, and imports

² Estimated.

³ Forecast.

⁴ Value of all products and service sold by industry SIC 2653.

⁵ Value of shipments of corrugated and solid fiber box products produced by all industries.

⁶ New supply is the sum of product shipments plus imports.

Source: Bureau of the Census and Bureau of Industrial Economics. Estimates and forecasts by the Bureau of Industrial Economics.

independents alike are seriously looking at it as something to be included in their capital plans. The market (for preprinted linerboard) will experience geometric growth and will surpass capacity quickly. In 1983 you'll see purchases of new equipment to fill this need."

One of the major challenges that converters in the corrugated industry must face up to is the need to lower their break-even points by closely examining such overhead costs as interest expense, depreciation and the cost of administrative, sales and other personnel not directly involved in the production process. The inevitable paring down will not be pleasant but must be faced squarely in times when survival is the name of the game.

Significant gains

More encouraging news is found in the recently released report of the Conference Board's Labor Outlook Panel. It notes that a recovery in

production levels because of a "thinned-out" labor force could "yield significant productivity gains."

There is still controversy over the Occupational Safety and Health

A recovery in production levels because of a "thinned-out" labor force could "yield significant productivity gains."

Administration's methods, and emotions are still aroused whenever OSHA even mentions possible changes in the standards that protect workers from hazards, but big industry now cheers more often than it complains.

The corrugated industry in Canada was hit (in its Eastern region only) by a strike in July that for the most part has now been settled. For many Northern U.S. plants this provided

them with a temporary windfall. Paperboard Packaging sees no spectacular growth in containerboard production in Canada this year; perhaps 2% at the most.

In Western Europe, gains for corrugated end of line packaging materials are projected at just 0.5% per year. Sales are seen inching up to \$3.74 billion in 1980 from \$3.55 billion by 1987, while usage builds to 5.56 million tons from 5.28 million.

Corrugated products, which had a 97% share of the Western European market in 1980, will see their portion decline to 96% in 1987 in terms of tonnage. Dollar share for corrugated products is forecast to slip to 91% in 1987 from 93% in 1980, according to Frost & Sullivan, Inc.

Because corrugated products in Western Europe have such a large share of the market, machinery investment in this area will continue to be a major factor for the packaging industry, as will investments in pallet-packing equipment.

'83 Forecast

continued

The "MAJOR EQUIPMENT" figures used in this buying forecast are computer tabulated and based on the responses to questionnaires sent out to box plants in compiling the Fall 1982 Official Container Directory.



DELAWARE
DISTRICT OF COLUMBIA
FLORIDA
GEORGIA
MARYLAND
NORTH CAROLINA
PUERTO RICO
SOUTH CAROLINA
VIRGINIA
WEST VIRGINIA



NEW JERSEY
NEW YORK
PENNSYLVANIA

Total United States

Major Equipment

Total number of corrugating and sheet plants	1342
Corrugators	612
Independent single facers	95
Letterpress printer-sloters	2221
Flexographic printer-sloters	779
Flexographic printing folder-glueers	1081
Folder-glueers	1038
Infold-glueers	76
Tapers & folder tapers	1989
Folder stitchers and stitchers	1512
Diecutters, platen jaw type	645
Diecutters, flat bed reciprocating	1001
Diecutter stations, rotary	686
Wax impregnators, and other coaters on corrugators	194
Curtain coaters	216
Laminators	483
Unitizers and load strappers	1149
Bundle tyers	1565
Computers	583

Estimated Expenditures

Materials

Corrugating adhesives	\$106,856,000
Printing inks	87,318,000
Waxes and coatings	94,368,000
Adhesives, including synthetic resins	15,936,000
Jointing tapes	25,440,000
Stitch wire and staples	6,528,000

Supplies

Printing plates and dies	47,872,000
Cutting rule and dies	35,360,000
Pallet materials	28,992,000
Twine	5,088,000
Strapping: steel and plastic	20,352,000
Baling supplies	2,208,000
Oil and lubricants	10,176,000
Maintenance supplies	26,112,000

South Atlantic

Major Equipment

Total number of corrugating and sheet plants	175
Corrugators	85
Independent single facers	8
Letterpress printer-sloters	283
Flexographic printer-sloters	138
Flexographic printing folder-glueers	149
Folder-glueers	141
Infold-glueers	3
Tapers & folder tapers	276
Folder stitchers and stitchers	198
Diecutters, platen jaw type	56
Diecutters, flat bed reciprocating	97
Diecutter stations, rotary	95
Wax impregnators, and other coaters on corrugators	32
Curtain coaters	33
Laminators	41
Unitizers and load strappers	155
Bundle tyers	187
Computers	63

Estimated Expenditures

Materials

Corrugating adhesives	\$16,439,100
Printing inks	12,858,230
Waxes and coatings	16,327,680
Adhesives, including synthetic resins	2,248,320
Jointing tapes	3,479,040
Stitch wire and staples	965,760

Supplies

Printing plates and dies	8,164,640
Cutting rule and dies	3,670,300
Pallet materials	4,460,160
Twine	630,720
Strapping: steel and plastic	2,934,720
Baling supplies	339,648
Oil and lubricants	1,565,472
Maintenance supplies	4,017,600

Middle Atlantic

Major Equipment

Total number of corrugating and sheet plants	249
Corrugators	115
Independent single facers	25
Letterpress printer-sloters	450
Flexographic printer-sloters	133
Flexographic printing folder-glueers	187
Folder-glueers	163
Infold-glueers	14
Tapers & folder tapers	392
Folder stitchers and stitchers	280
Diecutters, platen jaw type	118
Diecutters, flat bed reciprocating	232
Diecutter stations, rotary	121
Wax impregnators, and other coaters on corrugators	29
Curtain coaters	26
Laminators	103
Unitizers and load strappers	191
Bundle tyers	247
Computers	94

Estimated expenditures

Materials

Corrugating adhesives	\$20,035,500
Printing inks	16,555,770
Waxes and coatings	12,591,360
Adhesives, including synthetic resins	2,937,600
Jointing tapes	4,798,080
Stitch wire and staples	1,234,560

Supplies

Printing plates and dies	8,324,360
Cutting rule and dies	7,109,400
Pallet materials	5,435,520
Twine	829,440
Strapping: steel and plastic	3,610,560
Baling supplies	413,952
Oil and lubricants	1,907,520
Maintenance supplies	4,896,000

'83 Forecast

continued



New England

CONNECTICUT
MAINE
MASSACHUSETTS
NEW HAMPSHIRE
RHODE ISLAND
VERMONT

Major Equipment

Total number of corrugating and sheet plants	86
Corrugators	36
Independent single facers	10
Letterpress printer-sloters	141
Flexographic printer-sloters	42
Flexographic printing folder-glueers	55
Folder-glueers	46
Infold-glueers	3
Tapers & folder tapers	151
Folder stitchers and stitchers	114
Diecutters, platen jaw type	46
Diecutters, flat bed reciprocating	90
Diecutter stations, rotary	29
Wax impregnators, and other coaters on corrugators	6
Curtain coaters	3
Laminators	37
Unitizers and load strappers	69
Bundle tyers	97
Computers	36

Estimated Expenditures

Materials

Corrugating adhesives	\$6,849,440
Printing inks	5,611,760
Waxes and coatings	4,427,520
Adhesives, including synthetic resins	974,123
Joining tapes	1,864,320
Stitch wire and staples	487,200

Supplies

Printing plates and dies	3,005,200
Cutting rule and dies	2,254,200
Pallet materials	1,857,600
Twine	334,080
Strapping: steel and plastic	2,282,880
Baling supplies	141,504
Oil and lubricants	652,320
Maintenance supplies	1,673,760



East North Central

ILLINOIS
INDIANA
MICHIGAN
OHIO
WISCONSIN

Major Equipment

Total number of corrugating and sheet plants	382
Corrugators	156
Independent single facers	30
Letterpress printer-sloters	603
Flexographic printer-sloters	175
Flexographic printing folder-glueers	278
Folder-glueers	228
Infold-glueers	23
Tapers & folder tapers	599
Folder stitchers and stitchers	429
Diecutters, platen jaw type	205
Diecutters, flat bed reciprocating	254
Diecutter stations, rotary	185
Wax impregnators, and other coaters on corrugators	30
Curtain coaters	41
Laminators	146
Unitizers and load strappers	313
Bundle tyers	425
Computers	141

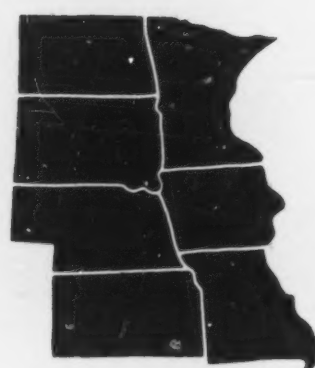
Estimated Expenditures

Materials

Corrugating adhesives	\$27,912,800
Printing inks	23,436,490
Waxes and coatings	21,309,120
Adhesives, including synthetic resins	4,368,960
Joining tapes	7,435,200
Stitch wire and staples	1,920,000

Supplies

Printing plates and dies	11,807,840
Cutting rule and dies	9,623,700
Pallet materials	7,573,440
Twine	1,376,640
Strapping: steel and plastic	6,063,360
Baling supplies	576,960
Oil and lubricants	2,658,240
Maintenance supplies	6,820,800



West North Central

IOWA
KANSAS
MINNESOTA
MISSOURI
NEBRASKA
NORTH DAKOTA
SOUTH DAKOTA

Major Equipment

Total number of corrugating and sheet plants	102
Corrugators	48
Independent single facers	8
Letterpress printer-sloters	170
Flexographic printer-sloters	68
Flexographic printing folder-glueers	80
Folder-glueers	59
Infold-glueers	12
Tapers & folder tapers	151
Folder stitchers and stitchers	113
Diecutters, platen jaw type	33
Diecutters, flat bed reciprocating	60
Diecutter stations, rotary	69
Wax impregnators, and other coaters on corrugators	24
Curtain coaters	35
Laminators	36
Unitizers and load strappers	107
Bundle tyers	124
Computers	81

Estimated Expenditures

Materials

Corrugating adhesives	\$6,164,940
Printing inks	4,536,840
Waxes and coatings	7,056,000
Adhesives, including synthetic resins	932,527
Joining tapes	1,567,680
Stitch wire and staples	317,760

Supplies

Printing plates and dies	2,313,520
Cutting rule and dies	2,283,100
Pallet materials	1,672,320
Twine	327,360
Strapping: steel and plastic	1,312,992
Baling supplies	127,392
Oil and lubricants	587,040
Maintenance supplies	1,506,240

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East South Central

ALABAMA
KENTUCKY
MISSISSIPPI
TENNESSEE

Major Equipment

Total number of corrugating and sheet plants	77
Corrugators	38
Independent single facers	2
Letterpress printer-slotlers	142
Flexographic printer-slotlers	48
Flexographic printing folder-glueurs	60
Folder-glueurs	135
Infold-glueurs	6
Tapers & folder tapers	135
Folder stitchers and stitchers	90
Diecutters, platen jaw type	40
Diecutters, flat bed reciprocating	56
Diecutter stations, rotary	44
Wax impregnators, and other coaters on corrugators	10
Curtain coaters	15
Laminators	24
Unitizers and load strappers	74
Bundle tyers	69
Computers	31

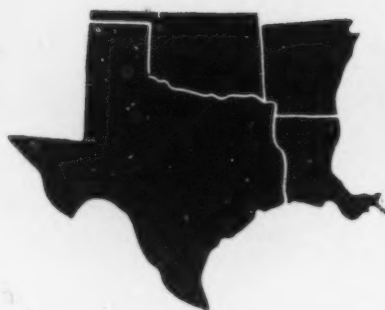
Estimated Expenditures

Materials

Corrugating adhesives	\$6,678,500
Printing inks	5,633,320
Waxes and coatings	6,088,320
Adhesives, including synthetic resins	1,034,880
Jointing tapes	1,591,680
Stitch wire and staples	404,160

Supplies

Printing plates and dies	3,058,000
Cutting rule and dies	2,051,900
Pallet materials	1,811,520
Twine	249,600
Strapping: steel and plastic	1,390,080
Baling supplies	137,952
Oil and lubricants	636,000
Maintenance supplies	1,632,000



West South Central

ARKANSAS
LOUISIANA
MISSISSIPPI
TEXAS

Major Equipment

Total number of corrugating and sheet plants	103
Corrugators	48
Independent single facers	8
Letterpress printer-slotlers	170
Flexographic printer-slotlers	68
Flexographic printing folder-glueurs	80
Folder-glueurs	59
Infold-glueurs	12
Tapers & folder tapers	151
Folder stitchers and stitchers	113
Diecutters, platen jaw type	33
Diecutters, flat bed reciprocating	60
Diecutter stations, rotary	69
Wax impregnators, and other coaters on corrugators	24
Curtain coaters	35
Laminators	36
Unitizers and load strappers	107
Bundle tyers	124
Computers	51

Estimated Expenditures

Materials

Corrugating adhesives	\$ 9,076,100
Printing inks	7,030,870
Waxes and coatings	11,484,480
Adhesives, including synthetic resins	1,238,400
Jointing tapes	2,018,880
Stitch wire and staples	536,640

Supplies

Printing plates and dies	3,802,480
Cutting rule and dies	2,658,800
Pallet materials	2,462,400
Twine	434,880
Strapping: steel and plastic	2,258,880
Baling supplies	187,200
Oil and lubricants	864,288
Maintenance supplies	2,217,600



Mountain

ARIZONA
COLORADO
IDAHO
MONTANA
NEVADA
NEW MEXICO
UTAH
WYOMING

Major Equipment

Total number of corrugating and sheet plants	29
Corrugators	10
Independent single facers	—
Letterpress printer-slotlers	37
Flexographic printer-slotlers	17
Flexographic printing folder-glueurs	22
Folder-glueurs	21
Infold-glueurs	2
Tapers & folder tapers	39
Folder stitchers and stitchers	30
Diecutters, platen jaw type	12
Diecutters, flat bed reciprocating	20
Diecutter stations, rotary	13
Wax impregnators, and other coaters on corrugators	—
Curtain coaters	7
Laminators	10
Unitizers and load strappers	17
Bundle tyers	43
Computers	13

Estimated Expenditures

Materials

Corrugating adhesives	\$1,369,000
Printing inks	1,612,380
Waxes and coatings	829,440
Adhesives, including synthetic resins	376,800
Jointing tapes	451,296
Stitch wire and staples	111,360

Supplies

Printing plates and dies	1,143,560
Cutting rule and dies	805,375
Pallet materials	371,520
Twine	127,680
Strapping: steel and plastic	269,760
Baling supplies	27,840
Oil and lubricants	130,464
Maintenance supplies	334,080

'83 Forecast

continued



Pacific

Major Equipment

Total number of corrugating and sheet plants	139
Corrugators	76
Independent single facers	4
Letterpress printer-sloters	229
Flexographic printer-sloters	90
Flexographic printing folder-glueers	171
Folder-glueers	185
Infold-glueers	1
Tapers & folder tapers	195
Folder stitchers and stitchers	145
Diecutters, platen jaw type	102
Diecutters, flat bed reciprocating	132
Diecutter stations, rotary	61
Wax impregnators, and other coaters on corrugators	39
Curtain coaters	21
Laminators	750
Unitizers and load strappers	116
Bundle tyers	249
Computers	73

Estimated Expenditures

Materials

Corrugating adhesives	\$12,329,140
Printing inks	10,191,720
Waxes and coatings	13,974,720
Adhesives, including synthetic resins	1,858,560
Joining tapes	2,232,960
Stitch wire and staples	565,440

Supplies

Printing plates and dies	6,515,520
Cutting rule and dies	4,118,250
Pallet materials	3,344,840
Twine	775,680
Strapping: steel and plastic	2,008,320
Baling supplies	254,400
Oil and lubricants	1,174,080
Maintenance supplies	3,012,480

Converter's Buying Plans Will Center on Payback Potential in '83

Spending will slowly start picking up late this year.

"Right now the emphasis is on payback. There are not many people out there buying machinery."

Although this observation from the president of a corrugated box plant might be considered by some a gross generalization, after speaking to key equipment manufacturers and box-makers throughout the nation, Paperboard Packaging agrees with it. In talking to those executives with purchasing power, many of them noted that they had not bought any new equipment in years. But more importantly, when asked if they had any plans to purchase new equipment in the next couple of years they all answered in the affirmative.

Probably a major reason for this development is the effect of what was seen at DRUPA last June. Numerous converters did not realize until they attended the largest paper converting machinery show in the world (the next one will be held in 1986, not 1987, by the way) how out of date some of their equipment really was.

Those who attended DRUPA did some serious shopping but not many cash registers were ringing, so to speak. It was more a matter of watching machinery demonstrations, taking a lot of notes and asking a lot of questions. Then, corrugated and folding carton converters returned home to evaluate all the research and fact finding done in what was for most an event-filled two weeks in Dusseldorf.

Of course, whether the plant is an integrated or an independent it must produce a steady cash flow to generate capital spending programs and unfortunately for the majority of plants in the nation (and, for that matter, the world) therein lies the problem: profits are not materializing. Independent plants are buying when they get a good deal but it is the integrators that must help lead the way. Integrators operate on profits and when they aren't showing

up on the bottom line (which happened to many of them last year) shifts are eliminated, machinery runs at undercapacity and many people find themselves out of a job.

Increase in activity

Another equipment supplier spokesman noted that his company experienced an increase in activity at the end of last year.

"People are asking for quotes and I'm sure they will study and go over those quotes very carefully (before buying)," he notes. "'83 will be better than '82 but not much better. We're looking to '84."

However, at the same time another supplier notes that "a lot for things will have to happen in '83 for things to pick up in '84. Companies are in tough shape and in scary conditions."

Classically, the corrugated and folding carton industries follow upturns in the economy by around six months so that even if encouraging economic news began dominating the headlines across the country today equipment manufacturers would not reap the benefits of the unleashing of capital funds until June at the earliest. The recession is now a year and a half old. When will it end? Despite all of the rhetoric flowing out of the mouths of Washington politicians from the President on down, Paperboard Packaging does not see an end until April at the earliest.

Used equipment (measured in terms of units sold) started out behind comparable 1981 figures last year but by the fourth quarter sales were dead even with '82, indicating a pickup in the second half. For the first six months of '83 used equipment sales will be even with '81 figures; i.e. ahead of '82. In other words, the first quarter of '83 will be up around 10% over the comparable period last year.

The aftermarket will continue to remain a crucial part of a converter's equipment purchasing decisions. There are five key aftermarket areas: warranty service, price of parts, availability of parts, availability of service, and serviceability of equipment.

Retrofitting developments

Another trend that will be prevalent next year and in years to come is the conversion and retrofitting of equipment, which will include

'83 Forecast

continued

presses, diecutters and folder-glueers.

Although flexographic printing is not yet a science like gravure, some truly impressive work is coming out of plants throughout the nation. Two, three and four color flexographic printing is on the rise as more and more converters realize that high quality printing jobs are being produced consistently.

In dollar terms, capital investment expenditures by the box converting industry will be down in 1983. The industry will probably be spending a little over \$6 million to upgrade and modernize its collective production plant. Paperboard Packaging estimates that no more than three full corrugators will be sold in 1983. True, interest rates have been moving down but nagging doubts remain as to whether or not they will stay down as the year progresses.

Foreign machinery manufacturers (especially the Italians) have been steadily improving their products to meet and maintain high American standards. U.S. equipment manufacturers can not afford to ignore them and converters, especially after DRUPA, are taking a closer look at what the Italians, Germans, British, Japanese and Swiss are entering into the market. The Italian government is helping the cause of its machinery manufacturers by offering attractive financing to potential American customers.

Finally, over the past year a number of major manufacturers have come out with press feeders and diecutters that have helped speed and accuracy rise steadily.

Folding Carton Industry Evolving in Several Directions

Vitality will lie in vigorous contention for new applications.

It has become almost traditional that comparison of annual folding carton forecasts with the realities

developed leaves the predictors looking less than divinely inspired.

The word "flat" has been applied so often, for so long, in describing the folding carton field that some question must begin to appear and grow.

It is to wonder whether this really is just another temporary economic pause, like that now stagnating other sectors—or whether the folding carton may be a matured commodity that simply has reached its full potential.

Any business plans for future participation in the folding carton market, by equipment sales or otherwise, must advisably accept that this is no longer anything like the competitive young enterprise that it once was.

The average American's use of folding cartons—in rough terms of pounds per year—is not growing. It is in fact declining steadily, and has been for a matter of decades.

What should be the reaction of even an amateur economist to the following factual statement, as applied to any long-established product:

"Its volume of consumption by the average citizen is 20% below that of 40 years ago, and during those four decades there has been no year in which the per capita consumption was not below that of the previous year."

The observer could only consider that, for whatever reason, the product referred to is subject to conditions, of some sort, that go beyond any contemporary economic ups and downs. He must consider further that these conditions are beyond the control or correction of the product's manufacturers, or their promotional efforts would have had some effect by now.

His further calculation would reveal that members of the present "homemaking generation"—those now entering their thirties—are using approximately 100 fewer of this product per year than their parents did.

He would have to feel that any upward forecasts for future years' expansion of this product must be based upon factors not quite visible from here. The product is the paperboard folding carton.

The upward forecasts of increasing volume do continue, however. One professional projection sees physical volume growth rates through 1987 as nearly double those of the 1970-80 period (a decade in which folding boxboard consumption rose 7.6%, in the face of a 9.5% population growth).

Not in the cards

If that doubling of rate were to be accomplished, it would mean that in the next five years folding boxboard volume must rise seven times as fast as it has in the entire previous 20 years. This simply does not seem to be in the cards.

It appears more realistic to expect that the carton industry will do well to maintain its present minimal rate of expansion, which is 80% of the growth in population. On that optimistic basis, folding carton production in 1987 would be less than 5% above 1982, and in 1990 would be less than 10% above.

That growth rate, which seems reasonably derived, is not sufficient to support the increasingly expensive maintenance of all existing carton plants, and the addition or replacement of equipment, at the former "normal" levels.

This assessment evidently is not lost upon profit-accountable managers of the carton industry. They appear alert to the possibility, and in fact many of them are not even strangers to it.

In their youth, for one of many examples, they saw the paperboard milk carton overwhelm and replace the clumsy, returnable glass bottle, only to be replaced in turn by the thin blown-plastic jug, which now has weathered legislative attack.

They saw the dozen-eggs-in-a-bag replaced by the segmented paperboard carton, and then saw the carton yield to a molded pulp or colorful foamed plastic. They have seen milady's high-volume hosiery box yield to the see-through film envelope. But it has been many years since they saw the paperboard carton take over from an alternate packaging. Now, the shoe is on the other foot.

Plants are closing

And so, they are not temporizing. They are closing the marginal plants. They can no longer be diverted by the enthusiastic marketing concepts that if we just improve the folding carton graphics, and motivate the salesmen ... No longer. They are

'83 Forecast

continued

simply closing the plants.

In the five-year span between mid-1977 and mid-'82, a total of 61 U.S. folding carton production facilities were closed, and 45 operating companies went out of business, according to the listings in our *Official Container Directory*—these listings being provided to us by the operating companies themselves.

Nor has that movement yet ended. In more recent months, a number of additional major folding carton production plants have been reported permanently closed. Not sold, or curtailed, but closed. And not ancient, obsolescent facilities that would cost too much to refurbish, but standard plants adequately equipped to operate in a promising market. The day is gone, apparently, when such properties were eagerly acquired, when available, by carton specialists seeking to expand share in a promising market.

What is it, then, that should be expected to happen in the next five years, such as not only to reverse

this incessant trend of the past 40 years, but also to double the expansion rate of the previous ten years? It would be a disservice to publish or repeat any such forecast. There are no factors or changing conditions visible that would validate or support it.

Any business plans for future participation in the folding carton market, by equipment sales or otherwise, must advisably accept that this is no longer anything like the competitive young enterprise that it once was.

Such business plans must relate to improving carton features and qualities designed to resist further inroads by competitive packagings, as distinct from seeking a significantly larger share in an expanding market. There is no expanding market.

Base is contracting

Successful equipment innovations will be directed to replacing or retrofitting existing machinery with more-effective operating details, rather than primarily to sell additional machines. The production base is contracting, not growing.

Many equipment producers are already looking to that basic revision of target, with mechanisms for automatic process control and monitoring, production speed-up, reduction of material waste, and other areas of eliminating avoidable cost. It may be predicted that the new or modernized plant of the future will be designed primarily with that outlook, rather than in expectation of any greatly expanded market volume.

Many may consider that an unduly pessimistic view. Much is made of the pent-up prospects for high prosperity "once the economy gets moving again" and consumers are less cautious about expenditures, and all product areas will resume their former glory.

For folding cartons, there are flaws in that view. It may very well be, for example, that the hoped-for upturn will appear—because it has to—in the besieged automotive and construction industries. The automobiles being driven today are wearing out, and the housing is bulging, and in time consumers will be forced to accept these high expenditures at whatever cost in other aspects of

Folding Paperboard Boxes (SIC 2651): Trends and Projections 1972-83

(in millions of dollars except as noted)

Item	1972	1977	1979	1980 ¹	1981 ¹	1982 ²	Compound annual rate of growth 1972-82	1983 ³	Percent change 1982-83 ⁴
Industry data									
Value of shipments ⁵	1,487.0	2,579.0	2,950.0	3,276.5	3,551.7	3,789.7	—	—	—
Value of shipments (1972 \$) ⁶	1,487.0	1,553.9	1,617.9	1,579.1	1,561.7	1,577.3	+0.6	1,604.1	+1.7
Total employment (000)	45.3	44.7	45.0	45.5	45.8	46.2	+0.1	46.5	+0.6
Production workers (000)	36.5	35.8	36.1	36.3	36.2	36.0	-0.1	36.2	+0.6
Average hourly earnings of production workers (\$)	3.90	5.71	6.40	6.91	7.47	7.94	+7.3	—	—
Capital expenditures	37.4	89.8	75.8	92.2	—	—	—	—	—
Product data									
Value of shipments ⁵	1,372.1	2,393.4	2,797.6	3,152.9	3,417.7	3,691.1	—	—	—
Value of shipments (1972 \$) ⁶	1,372.1	1,433.8	1,492.9	1,457.1	1,444.1	1,458.5	+0.6	1,483.3	+1.7
Product price index (1972 = 100)	100.0	127.4	132.9	154.8	171.1	183.0	—	—	—
Quantity shipped (1000 short tons)	2,525	2,639	2,748	2,882	2,652	2,679	+0.6	2,724	+1.7
Trade									
Value of exports	5.9	13.0	20.6	25.9	26.4	25.1	—	26.5	+5.6
Value of imports	5.0	10.0	14.8	15.6	9.6	9.5	—	12.0	+26.3
Export/shipments ratio ⁷	0.004	0.005	0.007	0.008	0.008	0.007	—	—	—
Import/new supply ratio ⁸	0.001	0.001	0.001	0.001	0.001	0.001	—	—	—

¹ Estimated except for product price index, exports, and imports.

² Estimated.

³ Forecast.

⁴ Value of all products and services sold by industry SIC 2651.

⁵ Value of shipments of folding paperboard box.

⁶ New supply is the sum of product shipments plus imports.

Source: Bureau of the Census and Bureau of Industrial Economics. Estimates and forecasts by the Bureau of Industrial Economics.

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continued

their life style. However, those industries never were prominent customers for folding cartons, and the money they extract, over years-long periods of mortgage payoff, will be unavailable for non-essential cartoned products.

On the other hand, some important national trends are highly supportive to folding carton futures. In the single area of foodstuffs, for example—largest single outlet for the cartons—the rise of "convenience" foods is no passing fad. These would include those sold in "ovenable" board containers for quick preparation. The potential is great and rising, as two-income families proliferate, and the working housewife has limited time. Retort pouches are growing in the same category as a time-saver, and have proved a fine application for cartoning.

Single-portion coming on

Another favorable long-term trend is in the single-portion packaging that caters not only to persons living alone but to family partners on conflicting time schedules. The latest census showed a 60% increase, over ten years, in the number of single-person households, where the single-portion package has an obvious appeal.

Further, there is the finding that with increased "eating out" by families and individuals, the proportion of food purchased at market for home preparation has dropped in recent years from a traditional 85% to a current 60%, as the fast-food stands increase in both number and menu variety. Many of these portions are served in disposable paper boxes or shallow trays, converted on folding carton equipment.

It is difficult to place any allegedly accurate estimate on the volume of folding cartons that may find a market in this expanding area. However, it is not difficult to calculate that the use of a single carton per day by each of this nation's people represents around 84 billion boxes per year.

How many folding cartons make a billion? If a single box-making machine were to produce one carton per second, 24 hours per day, it would require 11½ days to make a million cartons. But it would take

32 years to make a billion—and 2688 years to make 84 billion, the equivalent of one carton per day, per citizen, per year.

So, the industry is very far from moribund. However, those great new areas for expanding markets no longer exist, as the record of 40 years shows, and none is on the horizon.

The industry's vitality will lie in vigorous contention for present applications, through the innovative design for which it is already famous, together with continuing refinements in the efficiency of its processes, at all levels.

Total United States

Major Equipment

Folding carton plants	550
Cutters & creasers	1997
Letterpress printing presses	804
Offset printing presses	764
Up to three colors	255
Over three colors	304
Up to 60 inches	391
Over 60 inches	167
Dry offset or letterpress printing presses	110
Flexographic printing presses	186
Gravure printing presses, sheet & web fed	141
Gluers, timed: right angle infeed/outfeed tapered tray	832
Gluers, untimed straight line	1031
Waxers and waxing attachments	288
Laminators	143
Sheet cutters, guillotine	446
Sheeters, web fed	217
In-plant corrugated boxmaking equipment	48
Case sealers	217

Estimated Expenditures

Specialty papers	\$62,595,000
Inks, folding cartons and milk	122,655,000
Waxes & coatings, folding cartons	20,475,000
Corrugated containers	73,125,000
Die materials, including cutting rule	23,887,500
Press plates and other printing supplies, excluding ink (folding)	110,565,000
Adhesives, including synthetic adhesives	27,007,500
Embossing foils	18,230,000
Tapes	4,290,000
Maintenance supplies and materials (F.C.)	49,042,500



DELAWARE
DISTRICT OF COLUMBIA
FLORIDA
GEORGIA
MARYLAND
NORTH CAROLINA
PUERTO RICO
SOUTH CAROLINA
VIRGINIA
WEST VIRGINIA

South Atlantic

Major Equipment

Folding carton plants	66
Cutters & creasers	254
Letterpress printing presses	61
Offset printing presses	64
Up to three colors	25
Over three colors	23
Up to 60 inches	34
Over 60 inches	6
Dry offset or letterpress printing presses	8
Flexographic printing presses	27
Gravure printing presses, sheet & web fed	25
Gluers, timed: right angle infeed/outfeed tapered tray	109
Gluers, untimed straight line	108
Waxers and waxing attachments	50
Laminators	9
Sheet cutters, guillotine	44
Sheeters, web fed	27
In-plant corrugated boxmaking equipment	5
Case sealers	24

Estimated Expenditures

Specialty papers	\$ 4,805,775
Ink	9,418,500
Waxes and coatings (F.C.)	3,367,650
Corrugated containers	5,615,025
Die materials	2,074,800
Press plates and printing supplies	10,046,400
Adhesives	2,736,825
Embossing foils	1,407,900
Tapes	329,550
Maintenance materials and supplies (F.C.)	6,588,075

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Middle Atlantic

NEW JERSEY
NEW YORK
PENNSYLVANIA

Major Equipment

Folding carton plants	130
Cutters & creasers	155
Letterpress printing presses	271
Offset printing presses	197
Up to three colors	71
Over three colors	97
Up to 60 inches	106
Over 60 inches	43
Dry offset or letterpress printing presses	49
Flexographic printing presses	34
Gravure printing presses, sheet & web fed	38
Gluers, timed: right angle infold/outfold tapered trays	219
Gluers, untimed straight line	300
Waxers and waxing attachments	70
Laminators	31
Sheet cutters, guillotine	111
Sheeters, web fed	35
In-plant corrugated boxmaking equipment	6
Case sealers	48

Estimated Expenditures

Specialty papers	\$17,910,750
Ink	35,096,100
Waxes and coatings (F.C.)	4,290,000
Corrugated containers	20,923,500
Die materials	6,676,800
Press plates and printing supplies	37,440,000
Adhesives	7,458,750
Embossing foils	5,245,500
Tapes	1,227,525
Maintenance materials and supplies (F.C.)	24,550,500



New England

CONNECTICUT
MAINE
MASSACHUSETTS
NEW HAMPSHIRE
RHODE ISLAND
VERMONT

Major Equipment

Folding carton plants	53
Cutters & creasers	282
Letterpress printing presses	117
Offset printing presses	71
Up to three colors	27
Over three colors	26
Up to 60 inches	35
Over 60 inches	17
Dry offset or letterpress printing presses	13
Flexographic printing presses	8
Gravure printing presses, sheet & web fed	2
Gluers, timed: right angle infold/outfold tapered trays	66
Gluers, untimed straight line	106
Waxers and waxing attachments	21
Laminators	15
Sheet cutters, guillotine	44
Sheeters, web fed	18
In-plant corrugated boxmaking equipment	4
Case sealer	13

Estimated Expenditures

Specialty papers	\$ 6,483,750
Ink	10,413,000
Waxes and coatings (F.C.)	1,357,200
Corrugated containers	79,462,500
Die materials	2,598,375
Press plates and printing supplies	2,593,500
Adhesives	2,502,825
Embossing foils	1,555,125
Tapes	363,675
Maintenance materials and supplies (F.C.)	7,282,961



East North Central

ILLINOIS
INDIANA
MICHIGAN
OHIO
WISCONSIN

Major Equipment

Folding carton plants	137
Cutters & creasers	613
Letterpress printing presses	206
Offset printing presses	201
Up to three colors	71
Over three colors	77
Up to 60 inches	90
Over 60 inches	55
Dry offset or letterpress printing presses	23
Flexographic printing presses	41
Gravure printing presses, sheet & web fed	52
Gluers, timed: right angle infold/outfold tapered trays	191
Gluers, untimed straight line	260
Waxers and waxing attachments	70
Laminators	42
Sheet cutters, guillotine	103
Sheeters, web fed	52
In-plant corrugated boxmaking equipment	16
Case sealers	56

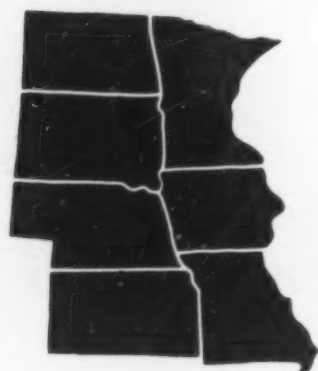
Estimated Expenditures

Specialty papers	\$16,446,300
Ink	32,227,650
Waxes and coatings (F.C.)	4,927,650
Corrugated containers	18,525,000
Die materials	5,728,125
Press plates and printing supplies	34,378,500
Adhesives	6,473,025
Embossing foils	4,816,500
Tapes	1,127,100
Maintenance materials and supplies (F.C.)	22,425,000

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'83 Forecast

(continued from page 45)



West North Central

IOWA
KANSAS
MINNESOTA
MISSOURI
NEBRASKA
NORTH DAKOTA
SOUTH DAKOTA

Major Equipment

Folding carton plants	38
Cutters & creasers	191
Letterpress printing presses	53
Offset printing presses	66
Up to three colors	31
Over three colors	22
Up to 60 inches	40
Over 60 inches	8
Dry offset or letterpress printing presses	—
Flexographic printing presses	24
Gravure printing presses, sheet & web fed	3
Gluers, timed: right angle infold/outfold tapered trays	57
Gluers, untimed straight line	60
Waxers and waxing attachments	20
Laminators	11
Sheet cutters, guillotine	34
Sheeters, web fed	20
In-plant corrugated boxmaking equipment	5
Case sealers	20

Estimated Expenditures

Specialty papers	\$ 5,482,425
Ink	10,742,550
Waxes and coatings (F.C.)	1,846,650
Corrugated containers	6,403,800
Die materials	2,012,400
Press plates and printing supplies	11,460,150
Adhesives	2,088,450
Embossing foils	1,604,850
Tapes	375,375
Maintenance materials and supplies (F.C.)	7,514,325



East South Central

ALABAMA
KENTUCKY
MISSISSIPPI
TENNESSEE

Major Equipment

Folding carton plants	30
Cutters & creasers	87
Letterpress printing presses	21
Offset printing presses	32
Up to three colors	19
Over three colors	12
Up to 60 inches	24
Over 60 inches	1
Dry offset or letterpress printing presses	3
Flexographic printing presses	9
Gravure printing presses, sheet & web fed	5
Gluers, timed: right angle infold/outfold tapered trays	40
Gluers, untimed straight line	43
Waxers and waxing attachments	5
Laminators	5
Sheet cutters, guillotine	19
Sheeters, web fed	13
In-plant corrugated boxmaking equipment	6
Case sealers	5

Estimated Expenditures

Specialty papers	\$2,572,050
Ink	5,039,775
Waxes and coatings (F.C.)	543,075
Corrugated containers	3,004,950
Die materials	753,675
Press plates and printing supplies	1,377,125
Adhesives	1,180,725
Embossing foils	753,675
Tapes	176,475
Maintenance materials and supplies (F.C.)	3,525,600



West South Central

ARKANSAS
LOUISIANA
OKLAHOMA
TEXAS

Major Equipment

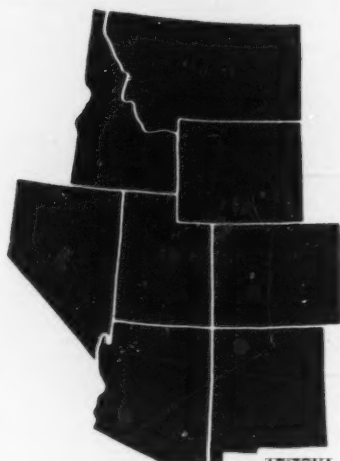
Folding Carton plants	28
Cutters & creasers	105
Letterpress printing presses	28
Offset printing presses	27
Up to three colors	27
Over three colors	8
Up to 60 inches	10
Over 60 inches	1 1/2
Dry offset or letterpress printing presses	5
Flexographic printing presses	16
Gravure printing presses, sheet & web fed	5
Gluers, timed: right angle infold/outfold tapered trays	37
Gluers, untimed straight line	40
Waxers and waxing attachments	13
Laminators	4
Sheet cutters, guillotine	16
Sheeters, web fed	12
In-plant corrugated boxmaking equipment	2
Case sealers	10

Estimated Expenditures

Specialty papers	\$2,402,400
Ink	4,709,250
Waxes and coatings (F.C.)	868,725
Corrugated containers	2,807,025
Die materials	1,188,525
Press plates and printing supplies	5,023,200
Adhesives	1,167,075
Embossing foils	703,950
Tapes	164,775
Maintenance materials and supplies (F.C.)	3,293,550

'83 Forecast

continued



Mountain

ARIZONA
COLORADO
IDAHO
MONTANA
NEVADA
NEW MEXICO
UTAH
WYOMING

Major Equipment

Folding carton plants	7
Cutters & creasers	27
Letterpress printing presses	11
Offset printing presses	10
Up to three colors	14
Over three colors	2
Up to 60 inches	4
Over 60 inches	—
Dry offset or letterpress printing presses	—
Flexographic printing presses	—
Gravure printing presses, sheet & web fed	—
Gluers, timed: right angle infold/outfold tapered trays	8
Gluers, untimed straight line	12
Waxers and waxing attachments	—
Laminators	—
Sheet cutters, guillotine	12
Sheeters, web fed	6
In-plant corrugated boxmaking equipment	—
Case sealers	1

Estimated Expenditures

Specialty papers	\$ 769,275
Ink	1,508,325
Waxes and coatings (F.C.)	—
Corrugated containers	898,950
Die materials	239,850
Press plates and printing supplies	1,608,750
Adhesives	259,350
Embossing foils	225,225
Tapes	52,650
Maintenance materials and supplies (F.C.)	1,054,950



Pacific

ALASKA
CALIFORNIA
HAWAII
OREGON
WASHINGTON

Major Equipment

Folding carton plants	61
Cutters & creasers	283
Letterpress printing presses	36
Offset printing presses	96
Up to three colors	41
Over three colors	37
Up to 60 inches	48
Over 60 inches	23
Dry offset or letterpress printing presses	9
Flexographic printing presses	27
Gravure printing presses, sheet & web fed	11
Gluers, timed: right angle infold/outfold tapered trays	105
Gluers, untimed straight line	102
Waxers and waxing attachments	39
Laminators	26
Sheet cutters, guillotine	63
Sheeters, web fed	34
In-plant corrugated boxmaking equipment	4
Case sealers	40

Estimated Expenditures

Specialty papers	\$ 6,890,325
Ink	13,501,800
Waxes and coatings (F.C.)	2,987,400
Corrugated containers	8,049,600
Die materials	2,615,925
Press plates and printing supplies	14,402,700
Adhesives	3,100,500
Embossing foils	2,017,275
Tapes	471,900
Maintenance materials and supplies (F.C.)	9,443,850

Rigid Paper Box Industry: Outlook Encouraging

For 1983 . . . gradual uptrend, then last-half acceleration.

The rigid box industry moved through the first three quarters of 1982 at an average dollar billings level 7.7% below that of 1981. January, February and June, 1982 were, however, better than or almost equal to the comparable months of 1981, while each of the other 1982 months fall to 10% behind. In the last quarter of '82 there is no evidence of a strong finish for the year, although a moderate improvement is anticipated.

We therefore expect the calendar year 1982 to fall 6% short of the dollar volume for the rigid box industry output achieved in 1981. Measured in dollars, the 1982 industry billings were on par with 1980, which was the second biggest dollar level ever.

In absolute dollars, 1982 industry sales were \$485 million—just short of the over one-half billion dollars totaled in 1981. Translated into deflated dollars the physical output dropped in 1982 by approximately 10%.

In dollars the 1967-1981 average annual growth rate of the RPB industry is 4.88%. Unfortunately, this rate has run behind inflation and, over the last 15 years, the industry's production index has declined from 100 to 70.

It must be noted, however, that over the same 15-year period the number of manufacturers of rigid (set-up) boxes shrank dramatically . . . from 454 establishments to fewer than 200 who employ 20 or more persons. Thus, in dollars and in physical units of output, the average remaining boxmaker shows growth.

The size of the pie is growing smaller, but since fewer companies are sharing the total, each slice is larger.

'83 Forecast

continued

A current sampling of manufacturers throughout the U.S. indicates that, yes, dollar income is down 6% and physical volume may be off 10%;

The rigid box industry, when stacked against the economy as measured in terms of Gross National Product, is in a moderate depression.

but profits are holding firm. Industry net profits before taxes, which surveyed at 5% in 1981, should average 6% in 1982.

The rigid box industry, when stacked against the economy as measured in terms of Gross National Product, is in a moderate depression. GNP rose at an annual rate of 6% and real output (GNP adjusted for price change) rose 2%, annual rate, and the implicit price deflator rose at a 4.5% annual rate.

According to a leading manufacturer of rigid paper boxes, it is not necessary to follow the currents of our economy and, with confidence, he is budgeting for increased business in 1983.

Like this producer, many box plant owners realize that since they are in the job shop business, they cannot just wait for customers to come in off the street. They must make and sell creative packages, provide service and, to remain successful, must be prudent managers producing a high quality product.

The life cycle of industries commences with infancy, progresses to growth, then maturity and finally enters the declining phase. For the last decade the RPB industry has been categorized as mature, but entering the declining phase. This may be true in industry terms but, fortunately for the individual manufacturer who offers fine rigid paper box packages, buyers remain enthusiastic.

Rigid boxes are preferred for many different products and for varied reasons. Confectioners need a package that sells, protects and is reusable. A rigid box meets these requirements. Items that need to be dressed up for gift-giving are best complemented by the rigid (set-up) box. Promotional packages are more

impressive if they are stiff, 3-D boxes overwrapped in a specially designed and colorful label.

There is almost universal confidence among the members of NP&PA that there is a promising future for rigid boxes. Well-run companies expect to continue serving their tra-

ditional markets and to creatively develop new users.

The outlook for 1983 is for gradual improvement during the first half of the year, then accelerated improvement after mid-year with sales to run between 5% and 7% ahead of 1982. □

End-Use Survey of Industry Sales

	(Percent)									
(Millions)	1973	1974	1975	1976	1977	1978	1979	1980	1981	
Textiles										
Apparel & Hosiery	9.5	4.9	7.5	3.7	4.8	7.3	4.5	4.4	5.5	
Dept. Stores & Specialty Shops	14.5	10.1	9.9	10.7	10.6	10.1	8.3	6.8	7.1	
Cosmetics & Soaps	4.4	3.9	1.8	5.3	5.1	3.3	4.3	5.5	3.9	
Confections	10.0	9.8	13.3	10.5	8.1	9.0	15.7	12.6	18.0	
Stationery & Office Supplies	7.6	10.4	9.7	12.5	13.2	11.8	15.0	13.5	9.3	
Jewelry & Silverware	8.7	8.6	5.2	4.2	14.0	10.7	7.6	9.3	9.7	
Photographic Products & Supplies	2.3	3.2	2.2	2.4	2.7	3.0	3.5	4.5	4.3	
Shoes & Leather	6.7	7.5	4.8	1.3	1.1	3.7	0.4	0.3	0.2	
Drugs, Chemicals & Pharmaceuticals	7.3	7.8	6.9	9.3	7.3	4.9	13.1	7.5	7.8	
Toys & Games	2.5	1.1	2.3	3.3	2.6	2.1	1.4	1.4	1.8	
Hardware & Household Supplies	4.6	7.7	7.0	6.4	6.2	5.4	3.4	5.5	4.0	
Food & Beverages	1.1	1.2	2.9	3.6	0.3	2.9	5.4	4.3	3.9	
Sporting Goods	1.6	1.4	1.9	0.7	1.0	1.2	1.7	1.2	1.2	
Other Major Customers (A)										
(a) Electronics		2.3	3.4	4.2	2.6	2.9	4.3	3.6	3.5	
(b) Educational		4.8	3.9	3.9	6.5	5.2	3.8	3.7	4.4	
(c) Other		10.5	12.2	5.6	7.1	10.7	1.1	8.4	7.0	
Misc. Customers	19.3	4.8	5.1	12.4	6.8	5.8	6.5	7.5	8.4	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Over the years NP&PA has documented the end-use markets for rigid boxes. A breakdown of annual sales is shown in this table.

February 1983

paper board packaging



**Preprinting and
Litho Laminating:
How will they
share the market?**

Press Feeder Update

AN **mhj** PUBLICATION

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vol 68 no. 2

February 1983

HB A HARCOURT BRACE JOVANOVIICH PUBLICATION



on the cover

The preprinting of linerboard has been discussed and debated for years and still a lot of people are asking questions and weighing options. What are the latest developments and how will it share the market with other processes? Story begins on page 18. Cover materials courtesy of Schiftenhaus Packaging, Newark, N.J.

features



Preprinting and Litho Laminating: How will they share the market? 18

A lot of people are talking about the pros and cons of these methods. A lot of people want to find out more about them, too.

by Mark Arzoumanian



Press Feeder Update 26

A glimpse of the latest technology available in the world market.

compiled and edited by Jim Larkins



Printer-Slotter Unveiled at Arvco Container 38

More than two dozen of the industry's production professionals saw the CCI machine during a recent open house.

by Fred Sharring



Independent Corrugated Converters Meeting Attracts Record Number of Attendees 40

Sessions were targeted on one major goal: helping executives increase plant profitability.



Assessing the Role and Importance of the Sheet Plant 42

A look at why these corrugated converting plants are here to stay.

by E. R. DePrez

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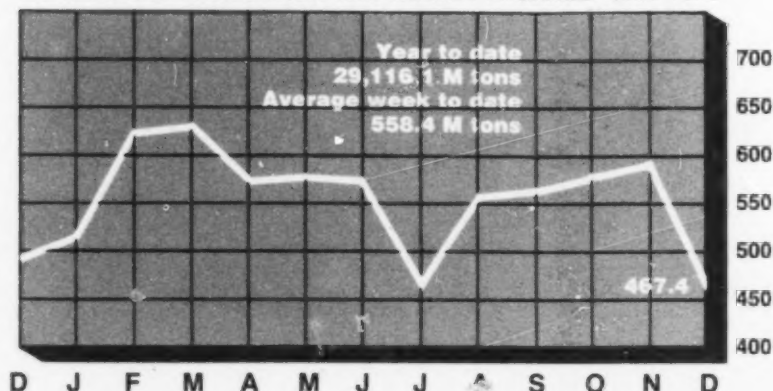
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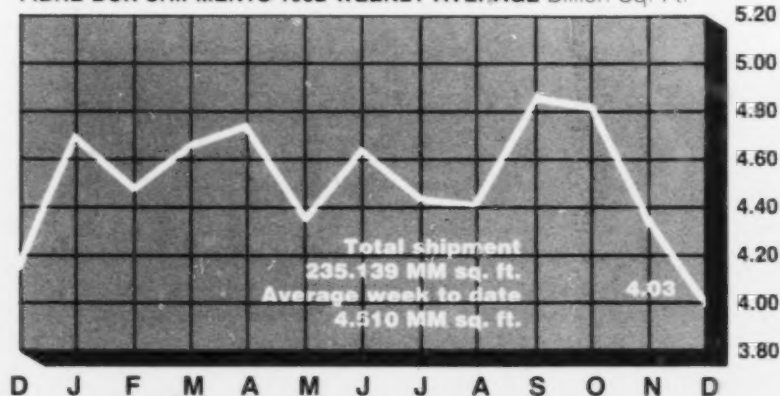
PAPERBOARD PRODUCTION 1982-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

Initial data for 1982—subject to minor refinements—indicate an approximate 29.1 million short tons of total paperboard production, down some 6% from '81 and 7.5% under the 31.5 million all-time high in 1979. Output in the fourth quarter was only a few points below the previous year's volume, after trailing by more than 9% at beginning of the quarter. However, this improvement is relative only to the recession-struck closing months of 1981, during which tonnage dropped far below 1980 levels. That reversal continued throughout 1982, and no significant upturn is yet seen in early 1983.

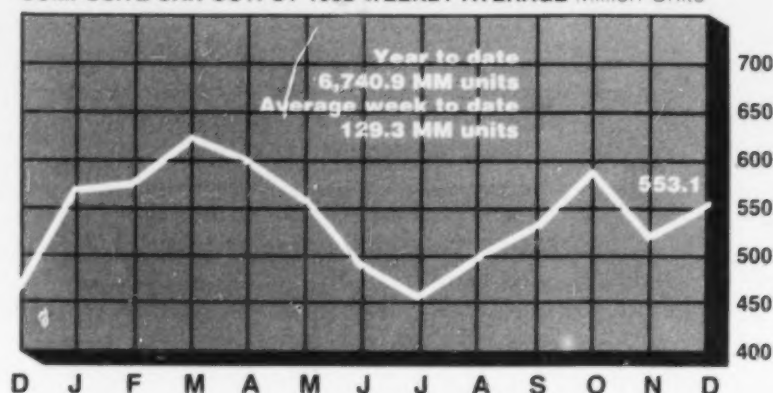
FIBRE BOX SHIPMENTS 1982-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

U.S. output in 1982 included 74% of containerboards, about six percentage points over traditional average. The disparity is due to some, though faded, export demand plus the decline of boxboard packagings under invasion from alternate materials, plus the economic depression. It is to be seen that boxboard gains during cyclical business upturns no longer fully recover their losses during recession. One victim of this evolution is the area of fiber reclamation for recycling, in spite of all campaigns. No upturn is visible in the waste paper area.

COMPOSITE CAN OUTPUT 1982-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Set-up box billings ended 1982 nearly 6% below '81—the first annual decline since a drop in depressed 1975 from '74, and following a half decade of increases averaging 7½% per year. At year-end, only two of eight major regional areas were ahead of last year's billings, with several in the double-digit minus range. Some relative upturn appeared in the final weeks, because of marked improvement in central sectors compared with the year earlier. The producers' association notes that if this continues, it is possible that the business "will evidently be on a recovery road."

March 1983

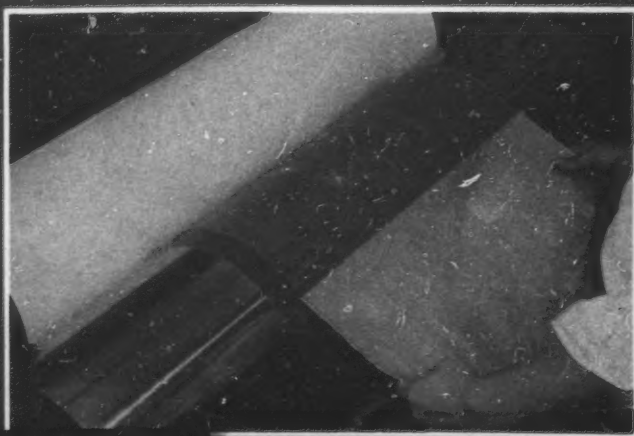
paper board packaging

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Premounting Fundamentals



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vol. 68, no. 3

March 1983

HBJ A HARCOURT BRACE JOVANOVIICH PUBLICATION



on the cover

Knowing how to premount is not something you learn overnight. A thorough knowledge of the fundamentals is a must. Photo on lower right, courtesy of Hercules Inc., shows a Merigraph® photopolymer plate being mounted using doublefaced tape on a mouter proofer. Story begins on page 18.

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features



- Productivity Levels Hinge on Knowing Premounting Fundamentals 18**
Matthews International Corp. is making certain that mounters do a professional job each and every run.

by Mark Arzoumanian



- Benefits of Renovating Pre-used Equipment Self-Evident at Graph Pak 22**
Folding carton converting plant concentrates on making previously owned machinery run with "brand-new" results.

by Fred Sharring



- Operator's Job Made Easy with State of the Art F F-G 28**
Aeon Box finds Emba's 240, with added control features, the perfect answer to its needs.



- Rule 41: The Changes Ahead 34**
Looking back over the entire history of the rule, it is quite remarkable that it has served so well through the years with so few changes.

by Thomas Muldoon



- Stripper/Pile Feeder Makes Diecutting "Sinfully Simple" 42**
Plant found the answer to its productivity problems with fully equipped Trimodular Segmetec diecutting system.

by Richard J. Arcand

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features *continued*



Conveyors Solve Problems in Straightforward Manner 45

Blower Application's pneumatic scrap removal system improves energy efficiency in corrugated and shipping container plant.



On-Line Metering of Adhesive Consumption 48

A system of adhesive rate measurement for consistently high quality at lowest starch cost.

by C. H. Sprague et al

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April: Folding Carton Competition Results

May: Auxiliary Equipment

June: Midyear Perspective

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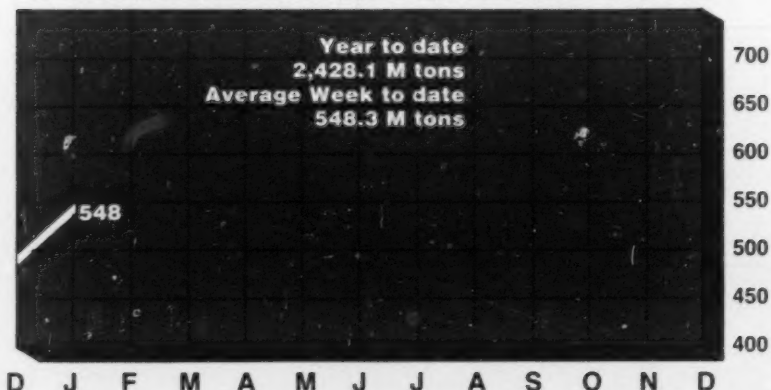
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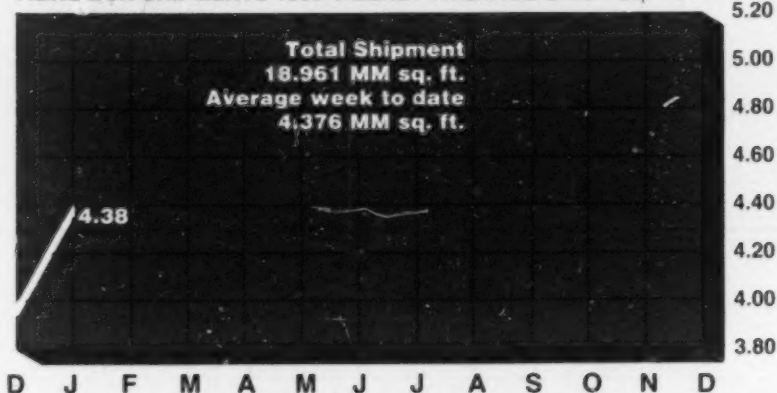
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

The first month of 1983 continued to reflect the moderate upturn that began late last year. A 2428.1-M-ton volume in January was up 7.5% from recessed '82, which had been down 8% from the previous year. However, the tonnage is little greater than that of 1972. This is in part because of extended holiday period mill shutdowns, to reduce the excessive on-hand board inventories, and a significant number of the industry's fourdriniers are still idled. The demand for converted packaging products, though rising, is well below normal levels.

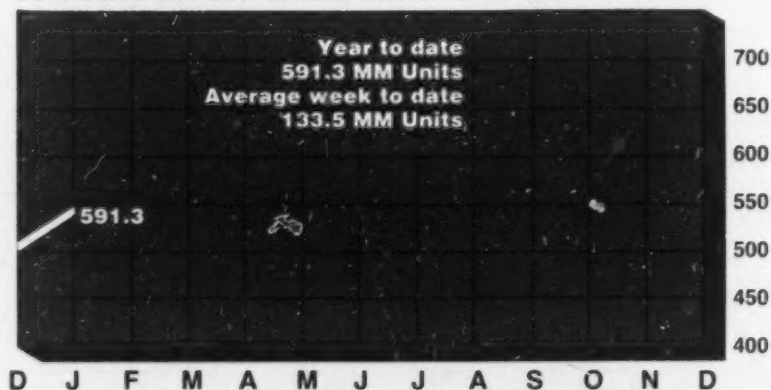
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

January's output included 1792 M tons of containerboards and 636 M of boxboards, up 8.2% and 8.3% respectively from the 1982 month, as projected on historic basis from the American Paper Institute's "production by furnish" tonnages. The advance in boxboard tonnage includes a rise of 10% for recycled grades and of 6% for bleached boards. The trend is evidently toward minimizing carton costs, since the price differential between solid bleached and clay-coated boards is at an all-time high, and continues to expand.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Set-up box billings, up about 5% from the level of early 1982, reflect an increase in unit price rather than in volume. The tonnage of rigid boxes (not reported by the National Paperbox & Packaging Association) in general parallels that entering folding cartons, whose expansion has been not only minimal but minus. This, again, is attributed to continuing recession in such high-volume industries as the automotive, many of whose accessories are small-box packaged—and also to the stagnation in consumer retail purchases of luxury or expendable items that are similarly packaged.

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April 1983

paper board packaging

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**Folding
Carton
Competition
Results**

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vol. 68, no. 4

April 1983

HB A HARCOURT BRACE JOVANOVIICH PUBLICATION



on the cover

Results of the Paperboard Packaging Council's 40th annual National Paperboard Packaging Competition show an industry actively involved in upgrading technology in aesthetics as well as practical engineering. The President's Award winner is a good example of packaging creativity. This feature, complete with photos, begins on page 22.

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in 40th Carton Competition 22**
Top PPC prize winner Mid-Cities Paper Box Co. gives Santa
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**Customer's Needs Are Paramount
at German Box Plant 44**
Werner H.K. Peters helps to meet them with its "Vacurant"
fingerless single facer.

by Mark Arzoumanian



**Indian Lore Brings Heap Big Success
to Boxmaker 46**
Image and unrelenting service and quality give Sheboygan
Paper Box a cross-country marketplace.



Infrared Heating and Its Applications 52
The industry is fighting prohibitive production costs with a
more efficient drying technique.

by Doug Misercola

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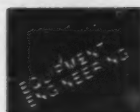
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**Western Kraft Installs
Key-Tech Non-Skid Spraying System 66**
Western Kraft solves a myriad of problems with a system that paid for itself in less than six weeks.



**Non-Tearing Axial Corrugation
May Become a Reality 71**
Engineers seek a way to corrugate so that flutes run the same direction as the paper movement.

by James H. Yoke

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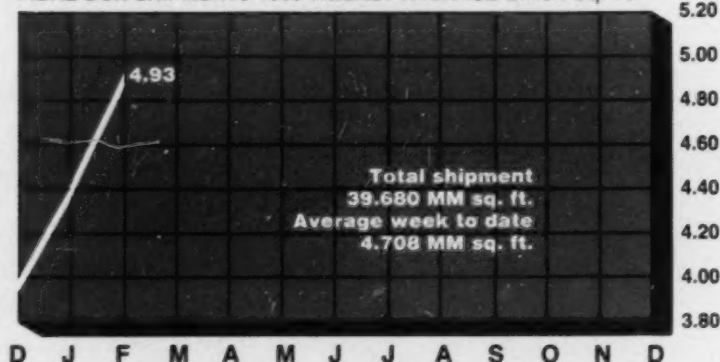
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

Through two months of 1983, paperboard production was up 6.8% from '82, though the margin was narrowing, and volume was 17% above a decade ago. Average-week tonnage in February was down 4.6% from 1982—which had been up 1.3% from '81, which had been 5.6% down from 1980—as mills delayed return to action after extended shutdowns for reduction of excess inventory. Boxboard output, however, was up 2.8% in the month, balancing a 4.6% drop in containerboards.

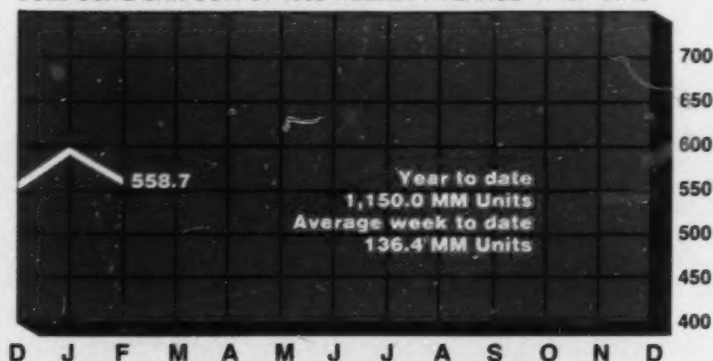
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In February, 2442.6 M tons of board included a projected 1796.7 M of containerboard types and 645.9 M of boxboards. The unfortunate long-term trend for some packagings is soon in the volume to date, relative to ten years ago—with containerboard tonnage up 27% from same-time 1973, but boxboard volume up only 1%. This relative vigor in containerboards is more reflective of domestic boxmaking than of the still-poor export demand, since conversion of corrugated remains up 5.7% from same-time 1982.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Set-up box billings (total reported sales) in early 1983 are up some 4% from '81, and by 50% in the ten years since 1973, as reported by major producers. This suggests a distinct decline in the tonnage of recent years, since in the parallel case of folding cartons, price per ton has gone up around 8% per year in that period. This would seem to substantiate the decade-long decline in boxboard output, as noted above, with geography having its usual strong influence on the level of local business vigor.

NOTE

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Hall of Fame Winner

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on the cover

The Signode Contrax Strapper at Lawrence Paper Co., Lawrence, Kan., is one example of the type of equipment described in *Paperboard Packaging's* feature dealing with strapping and bundling machinery and conveying systems. Story begins on page 28. (Photo courtesy of Inmont Corp.)

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Inks for Printing on Corrugated

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by Robert Gitlin



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Exports demand for both unbleached and bleached kraft paperboard have contributed to paperboard's overall strength so far this year.

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Modernization of St. Joe Container, South Hackensack, N.J., makes one wonder how it was able to compete before the change.

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July: Flexo Folder-Gluers Coatings

August: Salary Survey

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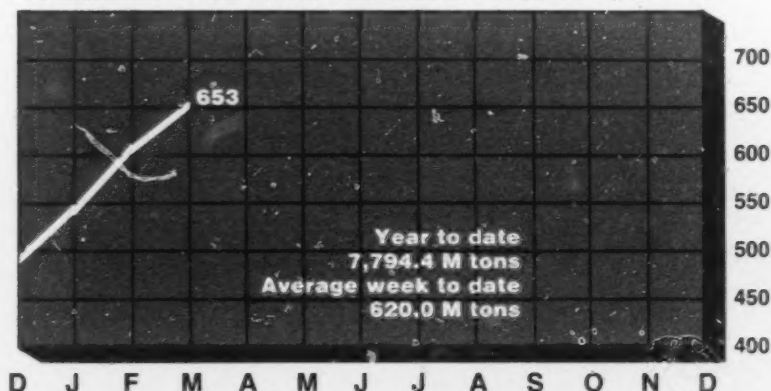
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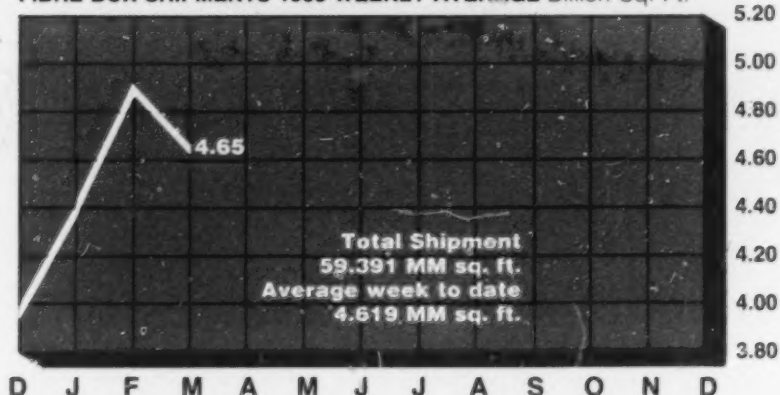
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

At first-quarter end, 1983's average weekly output was 3.5% above same period 1982 tonnage, compared with a drop of 4.7% in '82, from '81, and of 0.8% in '81 from '80, and a rise of 3% in '80 over '79. In March, 2892.6 M tons of production was 3.5% above last year, which had been 1.6% below the 1981 month. It is to be noted that the containerboard grades currently comprise 70% of total tonnage, compared with 66% a decade ago. This delineates the slow but steady decline in folding carton and rigid paper box volume, against competition.

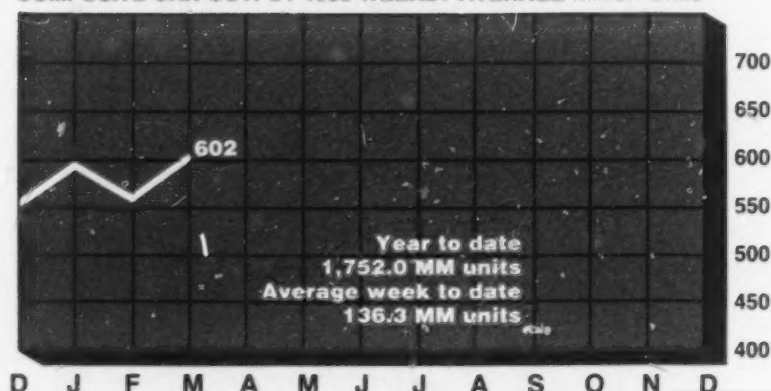
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In March, the total tonnage of board output included 2197.8 M of containerboards, up 3.3% from 1982 and by 22% in the decade, plus 694.8 M tons of boxboard grades, 3.8% higher than the depressed '81 month, but 15% below the volume of 1973. These reversals probably reflect a permanent evolution in the solid-board packagings. The converted products of boxboard grades are under successful attack by alternates, with "no place else to go." But our containerboards are the least costly in the world—anywhere in the world—and thus the demand is sustained.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Through the first 1983 quarter, set-up box business continued to show a slowdown, despite some signs of a general upturn. The national average billings are down only slightly, but the geographical variations in percentage, ranging from double-digit improvements in the industrialized East to similar declines in coastal areas and interior sectors, are again near all-time extremes. This again illustrates the vulnerability of boxboard packaging products to economy gyrations and to competition from alternate materials—and the latter will not disappear in the upturn.

NOTE

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paper board packaging

C 5250-3 6/14/83

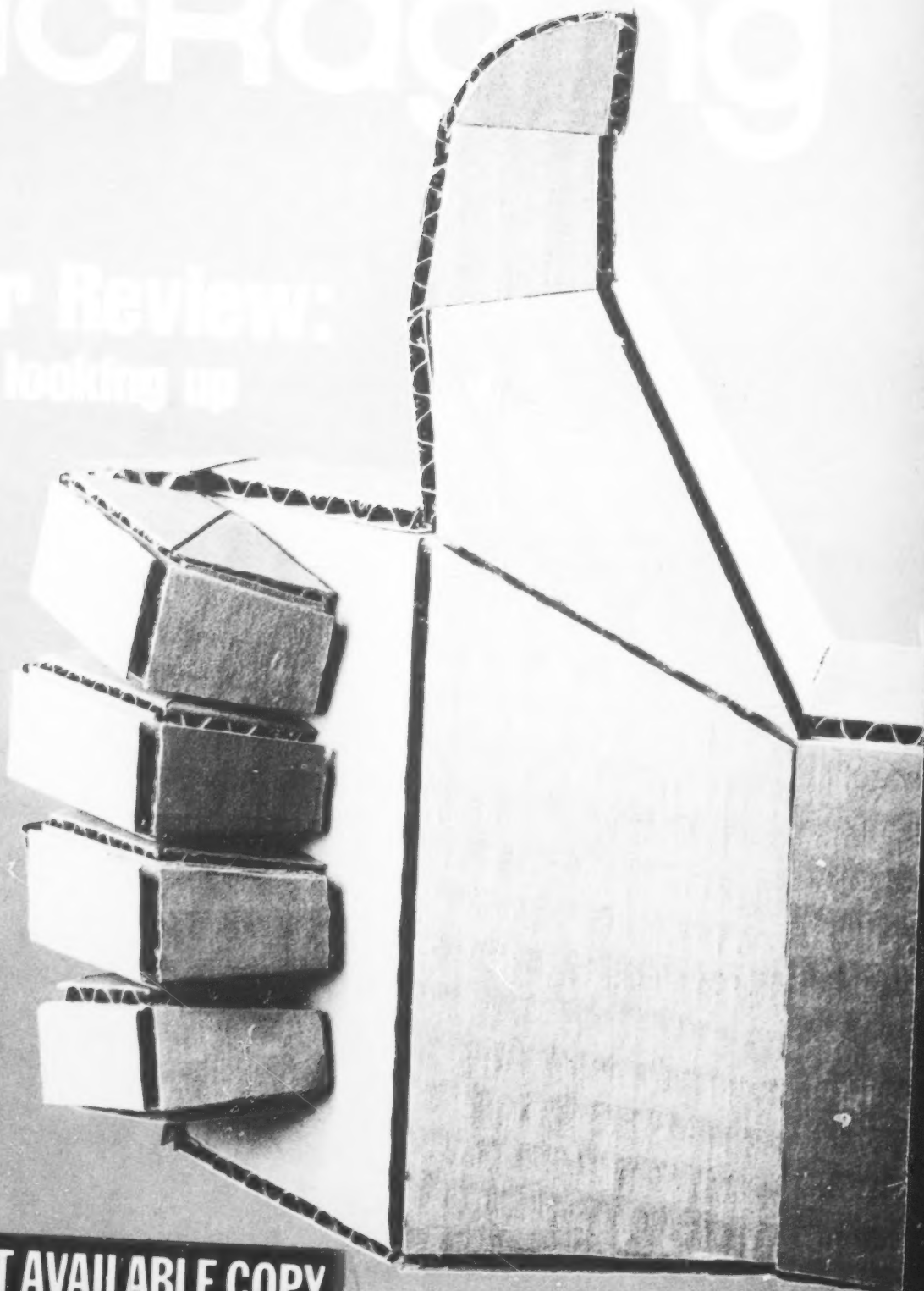
June 1983



Midyear Review:

Things are looking up

Rigid Box Winners



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June 1983

HBJ A HARCOURT BRACE JOVANOVIĆ PUBLICATION



on the cover

Although its constituents are not ready to expel a collective sigh of relief just yet, the paperboard converting industry is showing "thumbs up" with signs of renewed vigor, according to the experts in the Midyear Review beginning on page 22. (Cover design by Mary Hessing, photograph by Dick Brockman.)

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features



Midyear Review:

Finally, Things Are Looking Up 22
Will the upswing last long enough to enrich box plant coffers?
The jury is still out.



The Importance of People Is Never Passé.....30
Training and motivating people at all levels throughout an organization is more important today than ever before.

by Loren F. Ashwood



Rigid Boxes, Folding Cartons Garner Awards 32
Committee organizers and contest judges were surprised at the quality and quantity of entries in the 33rd Annual Paper Box Competition sponsored by the National Paperbox & Packaging Association.



FTA Awards Reflect High Pressmanship Quality 42
A large number of winning entries were printed with photopolymer plates.



Sun and Sales Predominate at Scottsdale 48
AICC'S Spring Meeting stressed the "how to" aspect of selling and sales meetings.

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*International Edition

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July: Flexo Folder-Gluers/Coatings

August: Executive Salary Survey

September: Statistical Issue/TAPPI

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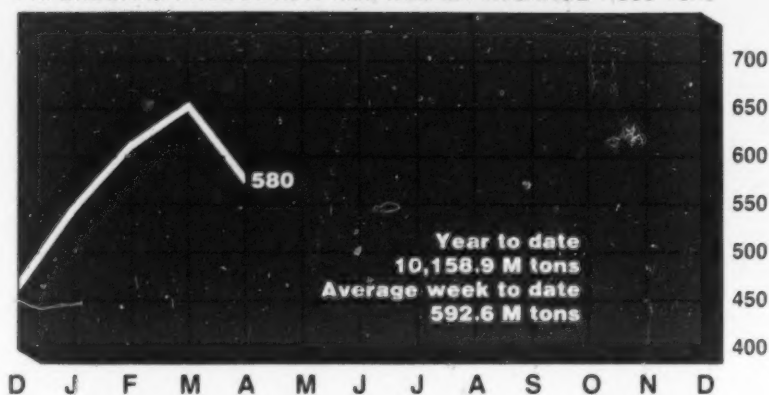
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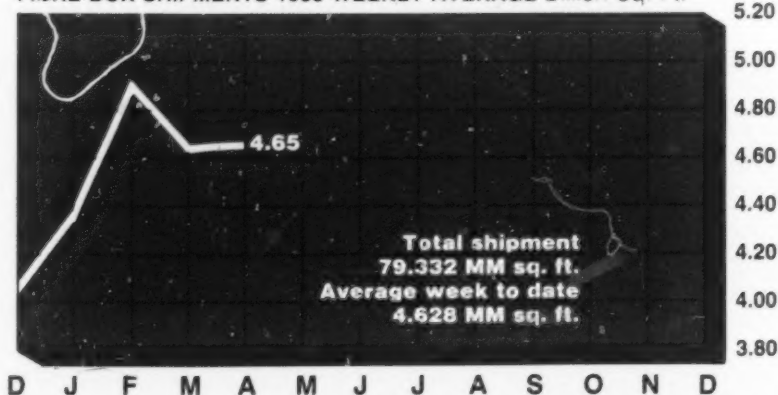
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

The year's first third ended with an average-week production 3.4% above 1982, which had been 7.1% below 1981, illustrating that the economic upturn has not yet reached "normal" earlier levels. During the April month, production volume was up 0.9% from '82—indicating a narrowing of earlier margins. Tonnage of containerboards was higher by 2.7%, with boxboards 4.0% down, as projected from the American Paper Institute's "production by furnish" data. This trend cannot be seen as portraying any sustained business surge.

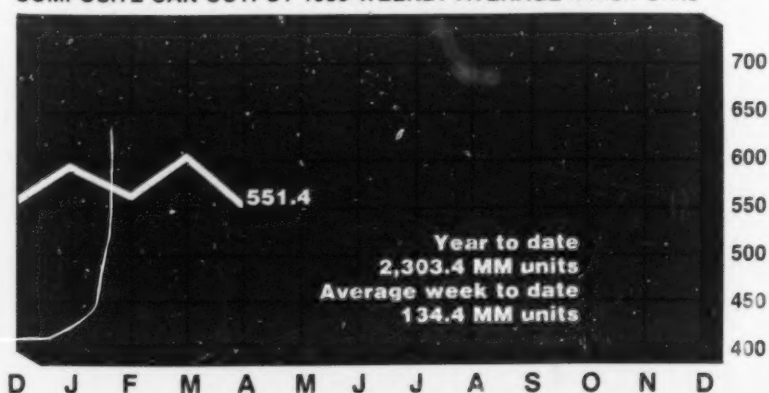
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In April, 2483.6M tons of board output made 1831.8M of containerboard types, up only 9% from the 1972 months, along with 651.8M tons of boxboards, 4% below both '82 and April of 10 years ago. This illustrates the effect upon "carton" boards, not only of current economic stress but of long-term inroads by alternate packaging forms and materials. Fibre container boards, by contrast, are also vulnerable to current economics but have no long-term competitors for shipping-container usage, and as are relatively "at ease."

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Through the first four months of 1983, "set-up" box billings were down 3% from '82, which had been about even with '81, which had been up 10% from 1980, for major box producers reporting National Paperbox & Packaging Association. The usual great variations appear, with monthly extremes ranging from plus 120% in one locality to minus 60% in another. Generally, orders continue to lag in the mid-country areas, beset by automobile and construction stagnation, while relatively flourishing in metropolitan sectors.

paper board packaging

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Focus on Flexo Folder-Gluers

volume 68, no. 7

July 1983

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on the cover

This issue focuses on flexo folder-glue. Our international roundup, as well as two other features about recent U.S. flexo installations, highlight current technology in this area. (Photo courtesy of Ward Machinery Co.)

features



**Independent Sheet Plant Soars
Despite Recessionary Climate 20**
Emphasis on package design and engineering, along with filling specific needs with right equipment, makes the difference.



**S&S "Workhorse"
Has Atlanta Plant Convinced 23**
Georgia Box's new flexo folder-gluer has top-of-the-line ruggedness with lower cost and simpler design.

by Robert Gitlin



**European and Far Eastern
Flexo Folder-Gluer Update 27**
Modular construction, motorized settings and integrated feeding and delivery sections are improving the state of the art.



**PCA Plant Benefits
From "In-Line" Coatings 32**
Attractive boxes are possible when color coatings are applied to board while it moves through the corrugator.

by Robert Gitlin



**Powerful Light System
Exposes Varnish Buildup 34**
Lord & Schoenberg's Model UV-1 LandSco Lights enable James River Corp. to use litho plates and still save money.



**Bobst Reaches
Milestone British Installation 38**
A Manchester folding carton plant is the 500th United Kingdom firm to install a Bobst Autoplaten® diecutter.

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API Expert Predicts Paperboard Rebound 39
The U.S. will regain its competitive edge as long as current trends continue.



Printing Systems of the Future 42
Cheaper printing and new varnishing techniques have already buttressed the printing industry's competitive position.
by A. Rettberg



Axial Corrugating: A Follow-Up 45
Improving on the basic concept of corrugated packaging is not going to be so easy.
by George G. Maltenfort

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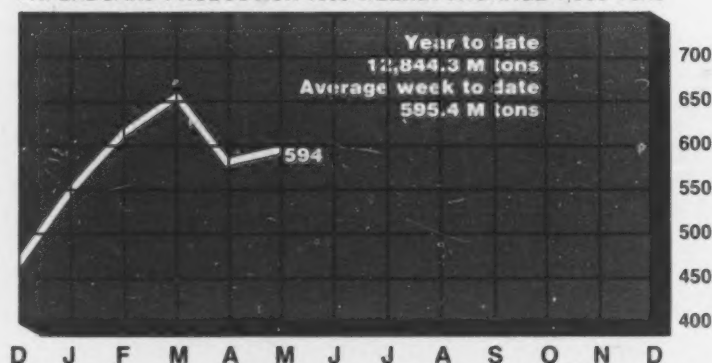
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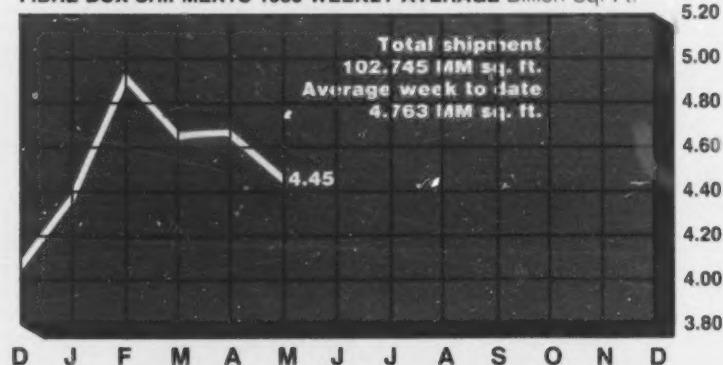
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

The 1983 average week saw 595,400 tons produced as of May-end. This was an increase of 2.9% from that time 1982, which had been 8.5% down from '81. However, the rate of improvement over '82 has slowed in the latest third of this year's 21 weeks to May-end. Overall output was down 2% from the previous (second) seven-week period, comprising a drop of 2.3% in unbleached kraft furnish and of 4.9% in recycled, along with increases of 1/2% in semichemical and 1% in solid bleached, together with sharp rises in waterpaper prices.

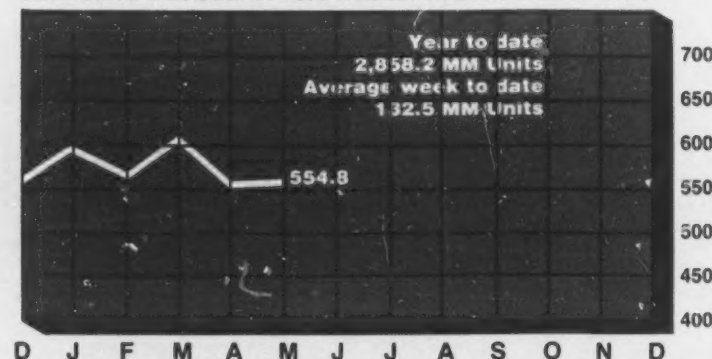
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

May produced 2629.2M tons of paperboard, up 2.8% from the '82 month, which had been down 9.5% from '81. Containerboards tonnage of 1992.0M was 3.2% up from last year, which had been 10.3% down from '81. The rise was 2.1% for boxboard grades, to 707.2M tons; last year had been 7.2% below the 1981 month. While the year's containerboard/boxboard tonnage ratio has returned to the 2.7-1 stage, this is a far cry from the "normal" 2-1 of earlier years, and appears to presage a permanent decline in boxboard packagings.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Recovering from early months of 1983, set-up box billings have risen steadily above last year's sales, which had been 8% below 1981. Thus, nearing mid-year, a majority of the eight geographical regions set by the National Paperbox & Packaging Assn. are above '82 volume. However, these are chiefly in the Midwestern sector, where double-digit improvements offset sharp declines on both seacoasts. The rise is due entirely to increase in unit ton-value, since the produced tonnage of rigid boxes continues to decline.

August 1983

paper board packaging

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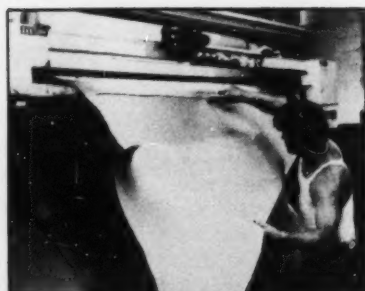
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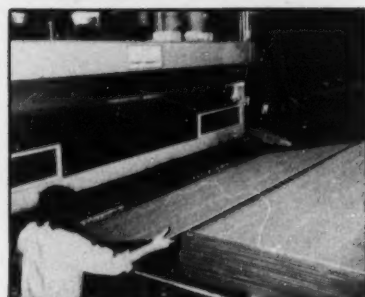
Paperboard Packaging gives the results of its first executive salary survey. Story begins on page 24.
(Cover design by Beth Travis-Betts. Photography by Dick Brockman.)



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24 Executive Salary Survey: How Do You Stack Up?

By Mark Arzoumanian

Paperboard Packaging surveys boxmaking personnel throughout the United States and comes up with some interesting results.

EQUIPMENT IN USE

28 Core Waste Problem is Only a Memory Now

By Robert Gitlin

Marquip Tailgrabber® splicers are part of Baltimore Box's game plan to achieve continuous operation with automatic order change.

EQUIPMENT IN USE

34 Flexo Printer/Slotter Spurs Arvco Production

By Robert Gitlin

Further automation will enable plant management to realize maximum potential from a sturdy piece of equipment.

DIE CUTTING

36 Bobst Fills Large French Order

Nine Swiss-made Autoplatens® SPO 2000 diecutters are ready to go on the production lines of various French plants.

RESEARCH

37 Flute/Liner Interaction For Bending of Combined Board Beams

By William S. Peterson

Stress fields develop in both liners and fluted medium when subjected to beam bending.

MEETINGS & CONVENTIONS

42 NP&PA Elects New Officers and Directors in Boston

"Progress in Packaging" will be the motto of the new president of the National Paperbox & Packaging Association.

(continued on page 6)

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EQUIPMENT UNVEILING

Recent open houses show how two major folding carton machinery manufacturers can help them stay ahead of the pack.

MEETINGS & CONVENTIONS

By Mark Arzoumanian

Second such meeting, sponsored by FEFCO, gives converters opportunity to learn about and exchange latest technology.

SHOWS & EXHIBITIONS

Visitors from around the world recently toured a major corrugated plant during a machinery exposition.

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October: Computer Software / AICC
November: Look at Presses

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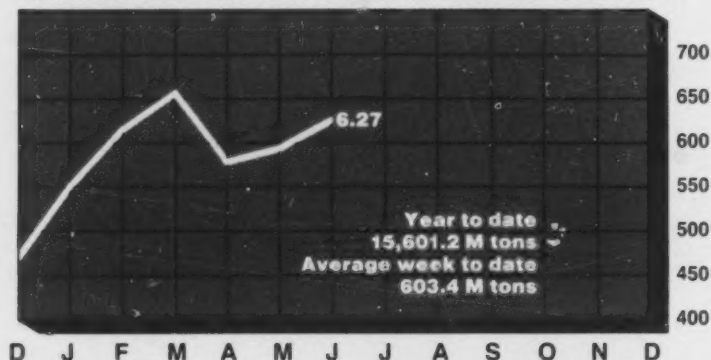
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Quality Assurance: George G. Maltenfort, Consultant
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International:
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UK: John A. Moore, Consultant
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INDUSTRY STATISTICS

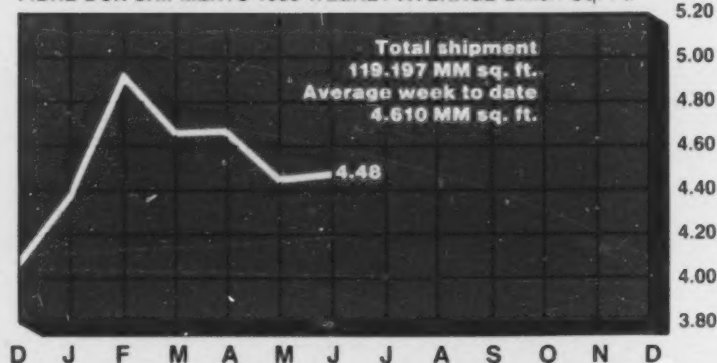
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

The first half of 1983 ended with an average-week board output 5.5% ahead of the 1982 tonnage, which had been 8.5% below '81, which was up 3.2% from '80, after a drop of 1% in '80 from '79. So shifts the tempest. June's volume of 2687.6 M tons was up 9.6% from last year's month, an accelerating rate of rise, since at first-quarter end the margin was less than 4%. The fortunes of containerboard demand vs. boxboards is more marked than ever before, with a full 3-to-1 ratio in June—half-again above the former standard 2-to-1.

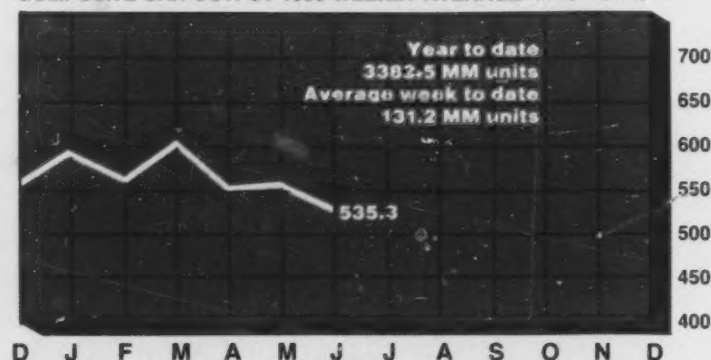
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In June, the output comprised some 2006.2 M tons of containerboard and 681.4 M of boxboards, as projected on basis of historic proportions from the API's reported "furnish" tonnages. The former grades were up 11.3% from 1982's month, and the latter by 6.6%, though the increase for unbleached kraft furnish (linerboard) is far above that for semichemical medium. This suggests that much of the liner production is going elsewhere than into domestic container conversion, since fibre box shipments are now about even with last year.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Through the first six months of 1983, rigid paper set-up box billings reported by members to the National Paperbox & Packaging Association varied wildly, with some areas showing double-digit improvements over 1982 in one month and deficits the next, and with some showing increases of more than 100% while other were down. It may be that this denotes some permanent evolution, since set-up boxboard consumed in 1982 was at its lowest ebb in reported history, down by 47% from 1972, by 52% from '62, and by 65% from '52.

Paperboard Packaging surveys boxmaking personnel throughout the United States and comes up with some interesting results.

Executive Salary Survey: How Do You Stack Up?

by Mark Arzoumanian
Editor

"How much do you make?" is the type of question that will inevitably get two types of responses from most people: a) none of your business; or b) an exaggeration.

Although it is considered rude to ask such a blunt question, the need to know (for whatever reason) has always been powerful.

With this in mind, *Paperboard*

decided it would be of great reader interest to conduct (to its knowledge) the first Executive Salary Survey of corrugated container and folding carton plant personnel in the United States.

Using the Fall 1982 *Official Container Directory* as a source, in early May a total of 534 questionnaires was sent out to executives of both independent and integrated corrugated and folding carton plants throughout the country. A total of

126 plant executives responded, for an excellent return rate of 23.6%. Those receiving the questionnaires were assured that "the information gathered would not be used in any other manner than what it is intended for in the first place," and *Paperboard Packaging* did not ask the respondent to identify himself or his company in any way whatsoever. Obviously, accurate responses were a must if the survey was to be valid and of use to the

Integrated Corrugated Box Plants

Percent of responses

1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	11
(c) \$750,000-\$2 million	0
(d) more than \$2 million	89
Total number of employees is	
(a) less than 25	0
(b) 25-50	11
(c) more than 50	89
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	0
(b) \$50,000-\$75,000	25
(c) \$75,000-\$100,000	12
(d) more than \$100,000	63
1982 vice president earned base salary of	
(a) up to \$40,000	0
(b) \$40,000-\$60,000	12
(c) \$60,000-\$80,000	25
(d) more than \$80,000	63

Base salary earnings/percent of responses:

	\$20,000 -\$30,000	\$30,000 -\$40,000	\$40,000 -\$50,000	\$50,000 -\$60,000	More than \$60,000
1982 general manager	0	0	0	40	60
1982 plant manager	0	8	42	42	8
1982 production manager	10	10	50	20	10

The average total compensation for sales managers in 1982 was \$52,000.

Independent Corrugated Box Plants

Percent of responses

1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	1
(c) \$750,000-\$2 million	30
(d) more than \$2 million	69
Total number of employees is	
(a) less than 25	25
(b) 25-50	32
(c) more than 50	43
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	26
(b) \$50,000-\$75,000	25
(c) \$75,000-\$100,000	19
(d) more than \$100,000	30
1982 vice president earned base salary of	
(a) up to \$40,000	35
(b) \$40,000-\$60,000	31
(c) \$60,000-\$80,000	19
(d) more than \$80,000	30

Base salary earnings/percent of responses:

	\$20,000 -\$30,000	\$30,000 -\$40,000	\$40,000 -\$50,000	\$50,000 -\$60,000	More than \$60,000
1982 general manager	17	33	14	24	12
1982 plant manager	49	30	16	0	5
1982 production manager	60	35	5	0	0

The average total compensation for sales managers in 1982 was \$53,000.

Integrated Folding Carton Plants

Percent of responses

1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	50
(c) \$750,000-\$2 million	0
(d) more than \$2 million	50
Total number of employees is	
(a) less than 25	33
(b) 25-50	0
(c) more than 50	67
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	16.7
(b) \$50,000-\$75,000	50
(c) \$75,000-\$100,000	16.7
(d) more than \$100,000	16.7
1982 vice president earned base salary of	
(a) up to \$40,000	0
(b) \$40,000-\$60,000	50
(c) \$60,000-\$80,000	25
(d) more than \$80,000	25

Base salary earnings/percent of responses:

	\$20,000 -\$30,000	\$30,000 -\$40,000	\$40,000 -\$50,000	\$50,000 -\$60,000	More than \$60,000
1982 general manager	25	0	25	25	25
1982 plant manager	25	25	25	25	0
1982 production manager	20	60	20	0	0

The average total compensation for sales managers in 1982 was \$45,000.

Independent Folding Carton Plants

Percent of responses

1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	6
(c) \$750,000-\$2 million	17
(d) more than \$2 million	77
Total number of employees is	
(a) less than 25	23
(b) 25-50	42
(c) more than 50	35
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	40
(b) \$50,000-\$75,000	26
(c) \$75,000-\$100,000	17
(d) more than \$100,000	17
1982 vice president earned base salary of	
(a) up to \$40,000	46
(b) \$40,000-\$60,000	36
(c) \$60,000-\$80,000	7
(d) more than \$80,000	11

Base salary earnings/percent of responses:

	\$20,000 -\$30,000	\$30,000 -\$40,000	\$40,000 -\$50,000	\$50,000 -\$60,000	More than \$60,000
1982 general manager	20	30	35	10	5
1982 plant manager	52	31	10	7	0
1982 production manager	48	43	9	0	0

The average total compensation for sales managers in 1982 was \$55,000.

Northeast U.S. All Plants

Percent of responses

1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	7
(c) \$750,000-\$2 million	27
(d) more than \$2 million	66
Total number of employees is	
(a) less than 25	17
(b) 25-50	21
(c) more than 50	62
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	27
(b) \$50,000-\$75,000	17
(c) \$75,000-\$100,000	24
(d) more than \$100,000	32
1982 vice president earned base salary of	
(a) up to \$40,000	26.5
(b) \$40,000-\$60,000	30
(c) \$60,000-\$80,000	17
(d) more than \$80,000	26.5

Base salary earnings/percent of responses:

	\$20,000 -\$30,000	\$30,000 -\$40,000	\$40,000 -\$50,000	\$50,000 -\$60,000	More than \$60,000
1982 general manager	15	15	9	33	28
1982 plant manager	31	24	26	13	6
1982 production manager	45	26	19	6	4

The average total compensation for sales managers in 1982 was \$52,000.

North Central U.S. All Plants

Percent of responses

1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	5
(c) \$750,000-\$2 million	17
(d) more than \$2 million	78
Total number of employees is	
(a) less than 25	17
(b) 25-50	29
(c) more than 50	54
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	22
(b) \$50,000-\$75,000	28
(c) \$75,000-\$100,000	19
(d) more than \$100,000	31
1982 vice president earned base salary of	
(a) up to \$40,000	27
(b) \$40,000-\$60,000	35
(c) \$60,000-\$80,000	16
(d) more than \$80,000	22

Base salary earnings/percent of responses:

	\$20,000 -\$30,000	\$30,000 -\$40,000	\$40,000 -\$50,000	\$50,000 -\$60,000	More than \$60,000
1982 general manager	18	23	23	18	18
1982 plant manager	38	23	19	15	5
1982 production manager	42	33	17	5	3

The average total compensation for sales managers in 1982 was \$52,000.

Salary Survey

continued

boxmaking industry. This, it is believed, has been achieved.

It should be noted that in order to make it as easy as possible for busy boxmaking executives to respond to this salary survey, *Paperboard Packaging* gave salary ranges under each title.

The eight tables that accompany this article are self-explanatory. They are broken down into the following categories: corrugated box plants (integrated and independent), folding carton plants (integrated and independent) and all plants (integrated and independent/folding and corrugated) by geographic region. There are four regions: Northeast, North Central, Southeast, and Western.

Noteworthy observations

Some observations worthy of note (although not at all surprising) include the fact that 63 percent of the president/chief executive officers of integrated corrugated box plants made over \$100,000 last

year while only 30 percent attained that level at independent plants.

Looking at folding carton plant percentages, the item of note is that the average total compensation for sales managers in 1982 is \$10,000 greater at independent plants.

Finally, looking at all plants by region, box plants in the West definitely pay the highest salaries, with the average total compensation for sales managers in that region a significant \$10,000 more than other region averages.

In addition to the information found in the tables, *Paperboard Packaging* posed three open-ended questions. The first asked: What factors do you take into consideration when deciding whether or not a particular salaried individual merits an increase? Responses included the following: performance, general wages in the area, productivity, the effort put forth, dedication, annual collective increases, attitude, company profitability, work habits, progress against stated goals, ingenuity, attendance, years of service, time since last raise, loyalty, growth potential, accuracy, diligence,

what the competition can pay the employee, the cost of living, the employee's workload, inflation, and leadership capabilities. These answers held true for all plants, whether independent or integrated, corrugated or folding carton.

Next, those surveyed were asked if they find that salaries the company has been paying over the past couple of years have stabilized because of the recession or continue to grow at a steady rate. The vast majority of those responding stated that salaries have stabilized.

The third and final question was: Based upon conversations you have had with friends possessing similar job responsibilities in other industries, how do their salaries compare to those in the paperboard converting industry? Although the majority said that they did not know or could not say, those who had an opinion believe that salaries in the industries *Paperboard Packaging* covers are comparable while a smaller percentage said the salaries were lower when judged against similar jobs in other industries. □

Southeast U.S. All Plants

	Percent of responses
1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	14
(c) \$750,000-\$2 million	21
(d) more than \$2 million	65
Total number of employees is	
(a) less than 25	28
(b) 25-50	24
(c) more than 50	48
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	39
(b) \$50,000-\$75,000	25
(c) \$75,000-\$100,000	7
(d) more than \$100,000	29
1982 vice president earned base salary of	
(a) up to \$40,000	31
(b) \$40,000-\$60,000	23
(c) \$60,000-\$80,000	23
(d) more than \$80,000	23

Base salary earnings/percent of responses:

	\$20,000-\$30,000	\$30,000-\$40,000	\$40,000-\$50,000	\$50,000-\$60,000	More than \$60,000
1982 general manager	0	26	16	21	37
1982 plant manager	31	19	19	23	8
1982 production manager	24	29	33	9	5

The average total compensation for sales managers in 1982 was \$50,000.

Western U.S. All Plants

	Percent of responses
1982 sales volume was	
(a) less than \$250,000	0
(b) \$250,000-\$750,000	14
(c) \$750,000-\$2 million	5
(d) more than \$2 million	71
Total number of employees is	
(a) less than 25	9
(b) 25-50	22
(c) more than 50	69
1982 president/chief executive officer earned a base salary of	
(a) up to \$50,000	9
(b) \$50,000-\$75,000	9
(c) \$75,000-\$100,000	23
(d) more than \$100,000	59
1982 vice president earned base salary of	
(a) up to \$40,000	11
(b) \$40,000-\$60,000	21
(c) \$60,000-\$80,000	21
(d) more than \$80,000	47

Base salary earnings/percent of responses:

	\$20,000-\$30,000	\$30,000-\$40,000	\$40,000-\$50,000	\$50,000-\$60,000	More than \$60,000
1982 general manager	6	6	11	33	44
1982 plant manager	12	21	33	29	44
1982 production manager	23	41	23	9	5

The average total compensation for sales managers in 1982 was \$62,000.

paper board packaging

September 1983

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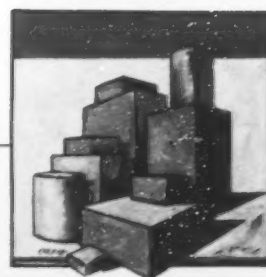
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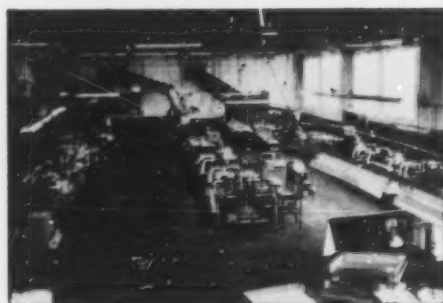
The most complete single compilation of statistical data on the paperboard industry is again presented in our annual statistics issue, starting on page 30. Cover design by Forrest Plesko



FEATURES

Year	Paperboard	%	Pa
1942	6,510,200	48.0	8.8
1952	12,225,600	50.1	12.1
1962	19,647,275	52.2	18.0
1972	31,041,700	52.2	28.4
1973	32,815,100	53.1	29.0
1974	30,087,800	50.6	29.4
1975	26,673,100	51.0	25.5
1976	29,024,800	51.3	27.5
1977	31,689,000	52.1	29.0
1978	34,337,000	55.3	27.7
1979	35,641,000	55.4	28.7
1980	35,862,000	55.4	28.9

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by A.R. Bideaux

Developments in folding carton productivity have helped penetrate a fearful buying climate.

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Will the recent recovery continue, or is it a blip in a continuing decline?

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88 Routamatic Machine Puts Precision in Position to Produce

Counter dies are made completely on machine, eliminating individual operation errors.

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90 MacMillan Bloedel Scores Safety Coup

Plant workers have responded enthusiastically to a company crusade against lost-time accidents.

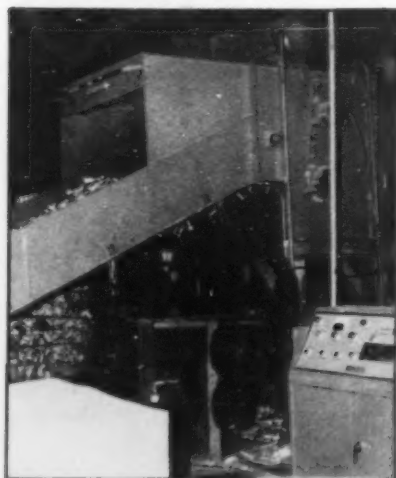
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Proper balance of corrugator heat levels is neglected by a lagging steam system technology.

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100 Shredder/Baler Eliminates Worry of Waste

Crane Carton no longer has floors filled with scrap at the end of a shift.

DIE CUTTING

104 Rotary Diecutter Gives Plant More Control

by Robert Gitlin

When Tecumseh Corrugated Box Co., Cleveland Division, stopped having to order diecuts outside the plant, productivity zoomed.

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November: Look at Presses

December: 1984 Calendar

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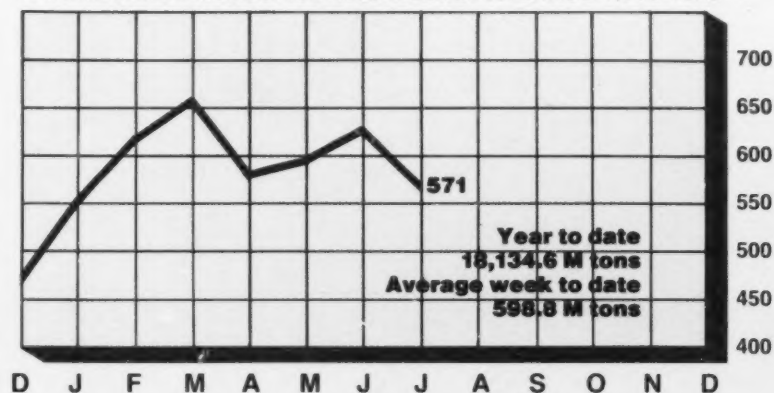
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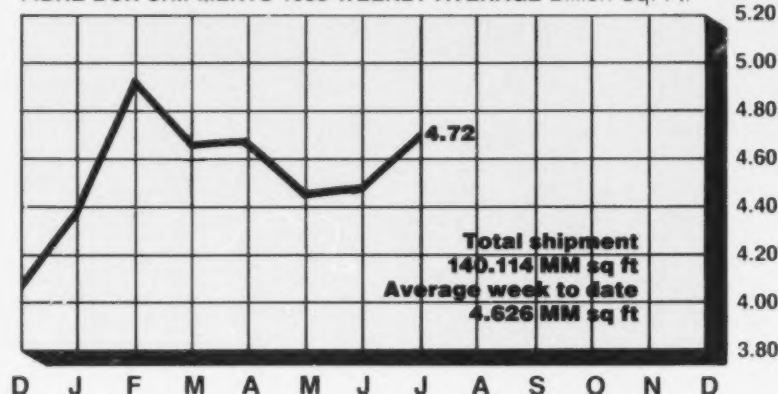
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

The first month of 1983's second half marked a continuation of the upturn in the second quarter. July's volume of 2529.0 M tons was up 23% from the 1982 month, which had been 23% down from '81, which had been up 8.4% from 1980. Thus, a return to traditional output levels seems to be appearing. This may be due in part to reduced downtimes for vacations and maintenance, because of improving business. However, board production and box conversion are varying vastly with region, as activity ranges from brisk in areas to relatively slow in farm industrial sectors.

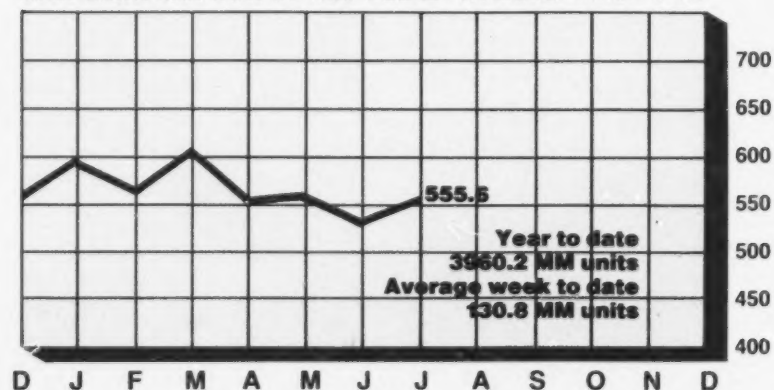
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In July, 1884.8 M tons of containerboard was up 25.3% from that month in 1982, while 644.2 M tons of boxboards reflected a 7.7% rise—both as projected from the API's "production by furnish" data. This devastating tonnage ratio of 3/1 compares with a traditional 2/1, and suggests that the overall packaging recovery is chiefly one of distance container shipments, rather than small-box business. Further, the July boxboard tonnage, though far up from '82, was in fact 2.3% below the volume of 1979 and 7.2% below '78, suggesting a long-term down-trend.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Through July, major set-up box-makers report a national rise of some 9% in total billings from 1982, compared with 8% over '81, 11% in '81 over '80, 7% in '80 over '79, 8% in '79 over '78, and 5% in '78 over '77. Thus, although the annual improvement in consistent, dollar-value of the rigid box market has not kept pace with inflation on a long-term basis. Again, the "point spread" is remarkable, between and among regional sectors, with advances above 30% in some areas and declines in others. This goes far to explain the reduction in number of "mom and pop" set-up boxshops.

*Will the recent recovery continue,
or is it a blip in a long-term decline?*

1983 Is Mixed Bag Of Ups and Downs

by Fred Sharring
Senior Editor
Paperboard Packaging
Editor
Official Board Markets

The year 1983 may well become remembered as embracing the widest range of business upheaval—from desperate recession to encouraging upturns—since the chopoff of the Great Depression in October 1929. Fortunately, in this case, the sequence is reversed.

This year was born into poverty. Major indicators—housing starts, auto sales, machine tool production, plant capacity utilization, and the like—had oozed to their lowest ebb for many decades.

In forest products/packaging, board production and package conversion were far down from years that had been rated unsatisfactorily in their time. Between mid-1982 and mid-'83, a dozen more folding carton plants shut down, bringing the total to 73 closings since the industry's high tide of 1977.

In the same 12 months, 51 more corrugated combiner and sheet plants closed, with the disappearance of 34 more producing companies. In January, this seemed a sort of industry swan song, after a half-dozen years of collapse that saw the net loss of 195 boxmaking plants and 206 firms.

And through it all gallops the run for cover from the eager diversification of earlier years. Whole divisions of mills and converting plants—cartons, composite cans, and what-not—sold piecemeal in exchange for the oncoming services field (insurance, finance, distribution, technical hardware) once so foreign to forest products.

It has not been a congenial time,

and now, even with beacons appearing all along the tunnel, some astute industry leaders wonder whether the best possibilities for recovery can ever again retrieve the former national lifestyle.

Can our "smokestack" industries ever again, at best, find room for all of those laid-off people? How many of them are simply superfluous? How many could, or

Can our "smokestack" industries ever again, at best, find room for all of those laid-off people?

should, be retrained for those more demanding new skills, when there is no shortage of well-grounded workers reported from the "high-tech" areas? Would it be easier all around to merely keep our growing excess of population on welfare? If so, how much of his own substance shall the typical worker be expected to contribute to the permanent non-worker?

Already, there is a more-than-solid stirring of national outrage, as the unorganized worker reads for the first time of the actual wage/benefit rates from which his organized counterpart is protesting the "giveback" in emergency labor contracts. These specifics were never published—before.

The \$16,000 school teacher is suddenly less than happy with the news that an assistant postal clerk may be making \$28,000—and the cost of a first-class mailing is about to go up again. The middle-class office worker, stuck with his dollar-a-ride-or-walk option, lately learns that the bus driver is making \$35,000.

The family head, wearily tuning

up his worn-out clunker for another year because he can't both buy food and pay \$10,000 for a new car, now hears that the "giveback" contract being protested by indignant auto workers involves a temporary cutback from \$48,000 to \$42,000 in average wages and benefits.

That is becoming a most polarizing public awareness of imbalance, and will remain so regardless of strength of economic upturn. It is at last penetrating the national mind that, with a gross national product expansion of 3% or less, the only way a Teamster or a Paperworker can get his 15% wage increase is by taking it out of my pocket—not his employer's. The time may be coming, very soon, when a stunned U.S. industry will wonder wistfully how it ever could have thought that improved capacity utilization was a social problem worth consideration.

It remains to be seen whether this recent-months recovery will continue, or is just a blip in a long-term decline.

In 1945 the U.S. industry made up half of the capitalist world's economy. We only contribute a third of it now, and our standing is predicted to drop to less than a fifth by the year 2000. We are seeing a gradual reduction in the economic privilege that provided our years of glory.

We must now compete against skilled foreign producers, without benefit of our former vast subsidy of cheapest energy and most abundant raw materials. We very likely will do this under global social and political harassment.

Paperboard packaging, in many forms, at least will have the advantage of renewable raw materials, with little significant competition

Statistics *continued*

on the horizon. However, it cannot be predicted what the volume of market will become, in a revising economy.

An industry leader has said: "The challenge is ours to develop new products that will open new markets, to help bring about the political changes which will make American industry more productive, and to understand and harness the new technologies which are at our doorstep."

Surely that must be the very minimum needed. And yet even this minimum is still receiving the disservice of widespread withdrawal from joint activities and shared progress.

If the industry is to remain recognizable, that parochialism must be reversed, somehow. Then there will be time for the questions of whether and how well even the strongest renewal of joint campaign effort can halt the deterioration.

'82 U.S. Production Down from '81 All-Time High

Paperboard in the General Economy

Table A-1: Total U.S. production of paper and paperboard in 1982 was down 6% from the all-time high of '81. An unfortunate measure of our faltering economy is that the '82 volume was only 3.8% larger than that of 10 years ago, in 1972, though up by 64% from '62, by 153% from '52, and by 253% from tonnage of 40 years ago, in 1942.

Also regrettable is that this is the last year in which we will be able to combine data provided by U.S. federal agencies with information from this industry's associations. The new federal austerity stance we may approve, but it has withdrawn these data services.

Further, the federal withdrawal comes at the same time that the industry's own associations have scampered back toward isolation, largely limiting the findings of limited activities to their own guild membership.

A-1 — Board & Tonnage Relationship (tons)

Year	Paperboard	%	Paper	%	Total Paperboard and Paper	%
1942	8,510,200	48.9	8,888,800	51.1	17,399,000	100.0
1952	12,225,600	50.1	12,197,200	49.9	24,422,800	100.0
1962	19,647,275	52.2	18,000,998	47.8	37,648,273	100.0
1972	31,041,700	52.2	28,425,150	47.8	59,466,850	100.0
1973	32,815,100	53.1	29,014,900	46.9	61,830,000	100.0
1974	30,087,800	50.6	29,421,100	49.4	59,508,900	100.0
1975	28,573,100	51.0	25,595,900	49.0	52,200,000	100.0
1976	29,024,800	51.3	27,580,000	48.7	56,604,800	100.0
1977	31,689,000	52.1	29,074,000	47.9	60,743,000	100.0
1978	34,337,000	55.3	27,729,000	44.7	62,066,000	100.0
1979	35,841,000	55.4	28,733,000	44.6	64,374,000	100.0
1980	35,862,000	55.4	28,912,000	44.6	64,774,000	100.0
1981	36,364,000	55.4	29,317,000	44.6	65,681,000	100.0
1982	33,842,000	54.8	27,888,000	45.2	61,730,000	100.0

Source: Bureau of Census and U.S. Pulp Producers Assn. Paperboard tons exceed classification of American Paper Institute in Paperboard Section of this issue through inclusion of certain boards not classified in institute figures

A-2 — Per Capita Production, Paperboard & Paper (pounds)

Year	U.S. Population	Paperboard	Paper	Total Paperboard & Paper
1942	134,772,650	126.3	131.0	258.2
1952	155,998,000	156.7	156.4	313.1
1962	186,591,000	210.6	192.5	403.5
1972	208,842,000	297.3	272.6	570.1
1973	210,404,000	311.9	275.6	587.7
1974	211,909,000	284.0	277.7	561.7
1975	213,641,000	249.7	270.6	499.3
1976	214,659,000	270.4	257.0	527.4
1977	216,363,000	292.8	266.8	561.6
1978	218,228,000	314.7	254.1	568.8
1979	220,099,000	325.9	261.1	585.0
1980	223,174,000	321.4	259.1	580.5
1981	226,292,000	321.4	259.1	580.5
1982	230,547,000	293.6	242.0	535.5

Source: Based on Table A-1 and mid-year population estimate of Bureau of Census

Table A-2: The 535.5-lb share of U.S. paper and board output accruing to each citizen in 1982 was the lowest individual volume in a half-dozen years. Fluctuating years they have been, since the 1982 total is in fact lower than that of 10 years ago, and is higher than only two other years of that decade—ghastly 1975 and a barely recovered '76—though up by 33% from 1962, by 71% from '52, and by 107% from 40 years ago in '42.

A development to be noted is that in the past decade, per capita paperboard share went down only 1.2%, compared with an 11.3% drop for paper grades. From another view—of the total 34.6-lb decrease in per-citizen share between '72 and '82—89% was in paper grades.

Table A-3: During each average day of 1982, each average U.S. citizen accounted for nearly three paperboard containers of the basic types listed. And these do not

include other packagings such as an estimated 32 billion milk cartons—about 160 per person per year—along with various other specialty packages that bring individual consumption much higher.

A wide variation is evident, however, in the long-term expansion of these several basic types. Thus, since 1972, the daily unit consumption of fibre containers is up by 35%, folding cartons 7%, fibre can and tube packaging 58%, and fibre drums by 46%, while set-up box consumption is 9% down.

Table A-4: Total value of unconverted U.S. paperboards, though the second-highest in history, was down 2.5% from 1981 because of reduced tonnage. In inflated dollars, the value was up 186% from 1972, by 375% from '62, by 630% from '52, and 2100% from '42. Unit ton value in '82 was an all-time high.

These disparities may be

Statistics *continued*

A-4 — Paperboard Annual Tons & Values

Year	Tons	Value (in billions)	Value Per Ton
1942	8,510,200	500,768	\$58.84
1952	12,225,600	1,539,575	125.93
1962	19,647,225	2,365,895	120.41
1972	31,041,700	3,919,639	126.27
1973	32,815,100	4,245,809	129.41
1974	30,087,800	4,715,070	152.70
1975	26,673,100	4,814,723	173.01
1976	29,024,800	5,518,022	190.11
1977	34,337,000	6,923,794	218.63
1978	35,641,000	7,629,681	222.20
1979	35,862,000	9,007,189	242.72
1980	36,364,000	10,335,428	288.20
1981	36,364,000	11,516,115	316.89
1982	33,842,000	11,229,643	331.83

Source: Tons and values are Bureau of Census. Tonnage figures vary from those of American Paper Institute through inclusion of certain boards not classified in Institute figures

attributed largely to recent-year "saturation" of the tonnage by high-priced boards. Thus, two-thirds of the total gain in average-dollar value over the past 20 years has appeared in the latest quarter of that period. Or—since 1972, a 9% rise in produced tonnage has seen a 163% increase in average value per ton. A good part of that rocketing must be due to general upgrading in boards consumed, rather than to such appreciation in direct value of the typical ton.

It remains to be seen how much longer this general upgrading can continue, in view of the exorbitantly rising costs of processing for visual effect alone, with no functional improvement.

Already, for example, the output of bleached sulfate pulps is falling below that of previous years, for the first time since that internationally beloved material became a significantly used grade a half-century ago.

Table A-5: In 1982 the total value of U.S. converted paperboard products was down 8% from '81, though up 112% in 10 years, by 313% in 20, by 530% in 30, and by 1356% in 40 years. This is only the second instance in four decades that total converted value was below the previous year. The other time was in badly depressed 1975.

In 1982, conversion processing added 59% to the value of its raw

A-3 — Principal Paperboard Packages Used, Per Day & Per Year*

M containers used per day

Year	Corrugated & Solid Fibre	Folding	Set-up	Cans & Tubes	Drums	Total Per Day	M. Containers Total Per Year
1942	11,520	154,000	17,580	5,140	26	188,240	70,590,000
1952	22,277	272,900	19,300	15,570	71	330,118	120,494,000
1962	33,905	381,400	14,367	18,870	87	448,629	163,750,000
1972	61,234	481,178	14,964	49,440	137	806,953	225,188,300
1973	65,888	489,839	16,580	53,346	145	825,798	228,416,300
1974	62,427	482,337	14,689	56,360	153	815,966	224,829,700
1975	56,175	448,574	11,082	53,451	130	570,582	207,930,300
1976	62,972	488,496	12,068	59,705	151	623,392	227,694,000
1977	66,123	497,350	13,070	64,303	163	641,009	233,968,000
1978	70,983	515,254	14,168	66,983	176	667,174	243,685,300
1979	76,121	517,892	15,058	69,070	184	678,325	247,758,200
1980	73,307	505,453	14,671	67,296	188	660,915	241,234,000
1981	74,757	499,799	14,337	67,824	190	656,907	239,771,000
1982	71,426	491,318	13,584	66,234	192	652,907	238,292,000
1982 Per Capita Use	0.310	2.131	0.051	0.287	0.0008	2.788	1,018

*Exclusive of certain sanitary containers.

A-5 — Value of Principal Converted Paperboard Products Shipments

Year	Fibre Boxes	Folding Cartons	Rigid Boxes	Other Converted Board Products	Grand Total
1942	\$441,030,000	\$214,289,500	\$99,859,000	\$164,100,000	\$1,228,342,800
1952	1,315,731,600	769,885,000	245,000,000	344,000,000	2,837,495,700
1962	2,000,415,600	952,200,000	245,568,000	1,131,880,900	4,330,064,500
1972	3,959,924,500	1,325,000,000	437,681,100	2,331,601,000	8,054,206,500
1973	4,862,056,300	1,460,000,000	484,950,000	2,751,281,000	9,558,287,300
1974	5,792,984,900	1,694,980,000	536,900,000	3,246,641,000	11,271,505,900
1975	5,623,765,200	1,755,000,000	483,155,000	3,361,600,000	11,223,520,200
1976	6,443,938,300	1,979,000,000	556,111,000	3,865,840,000	12,844,889,300
1977	6,741,744,100	2,105,000,000	602,268,300	4,114,413,000	13,563,425,400
1978	7,260,097,300	2,278,000,000	652,968,100	4,439,452,000	14,631,406,200
1979	8,407,894,000	2,435,000,000	707,878,000	4,899,899,000	16,450,471,000
1980	9,075,381,800	2,620,000,000	738,317,000	5,274,226,000	17,707,924,800
1981	10,019,521,200	2,866,000,000	787,800,000	5,801,059,000	19,474,380,200
1982	9,345,619,900	2,952,000,000	739,419,000	4,843,859,000	17,878,890,800

Sources: Fibre Boxes, Fibre Box Assn.; Folding Cartons, Bureau of Census and Paperboard Council; Set-up Boxes, Bureau of Census and Natl. Paperbox & Packaging Assn.; Other, including cans, tubes, drums sanitary containers and die-cut paperboard, from Annual Survey of Mfrs.

A-6 — Major Board Grade (tons)

Grades	1962	1972	1982
Containerboard	9,299,000 47.3%	16,018,900 51.6	17,507,500 51.7
Folding Boxboard	3,120,600 15.9	4,396,300 14.6	4,333,700 12.8
Set-up Boxboard	523,800 2.7	455,100 1.5	223,600 0.7
Milk/Food Board	1,620,800 8.2	1,699,600 5.5	1,283,700 3.8
Building Board	1,876,000 9.5	3,006,200 10.0	2,062,900 6.1
Cardboard	154,000 0.8	616,400 2.0	29,800 0.1
Wet Machine Board	162,000 0.9	135,900 0.5	118,200 0.3
Miscellaneous	2,891,675 14.7	4,713,300 14.3	8,262,600 24.5
Total	19,647,275 100.00	31,041,700 100.0	33,842,000 100.0

Source: Containerboard, folding rigid and special foodboards are as classified by American Paper Inst.; building board, cardboard, wet machine and total from Bureau of Census; miscellaneous is a balancing figure

materials (Table A-4), but 10 years ago the added value was 105%. This illustrates the recent-years' cost/price squeeze—the inevitable rise in materials cost, but the difficulty in getting corresponding price advances for packagings.

Value increases for individual products, over the decade, were:

fibre boxes 136%, folding cartons 123%, rigid boxes 69%, and other converted products 105%.

Table A-6: This summary for 1982 includes significant quantities of boards that are tabulated by the U.S. Bureau of Census but not by the American Paper Institute. To be

Statistics *continued*

noted are the decade's drop of 70% in Building Board tonnage, owing to the slump in construction, and the near-doubling of the Miscellaneous volume proportion, though API volume is up only 12% in the 10 years.

Table A-7: Between 1972 and '82 the tonnage of fibrous raw materials consumed in U.S. paper and paperboard manufacture went up by some 5 million tons. Of this total, an amazing 88% was in virgin pulps. For the remainder, reclaimed paper had a relatively surviving time of it. But the use of other non-wood fibres is actually down 32% in the decade. These include the scrap textiles, the bagasse residue of sugar cane, short-fibre cotton linters, and the like, all of them available in good quality and significant volume.

Wood Pulp Imports Are '82 Bright Spot

Wood Pulp Review and Outlook

Table B-1: U.S. domestic pulp production in 1982 was down 3.5% from the all-time high of 1981, though up by 12.5% from 10 years ago, by 80% from 20 years ago, and by 188% in 30 years.

Imports, however, were near the

A-7 — Tons of Fibrous Raw Materials Consumed in Paper and Board

Year	Pulp	Paperstock	Other	Total
1942	11,884,800	7,003,400	1,280,500	20,168,700
1952	18,631,600	9,076,200	1,360,200	29,068,000
1962	28,433,000	9,173,300	910,400	38,516,700
1972	47,347,000	11,703,000	910,000	59,960,000
1973	48,899,000	12,374,000	883,000	62,156,000
1974	48,517,000	12,106,000	770,000	61,393,000
1975	44,668,000	10,345,000	708,900	55,721,900
1976	46,968,000	10,167,000	760,000	57,895,000
1977	46,704,000	11,071,000	723,000	58,498,000
1978	50,114,000	13,178,000	741,000	64,033,000
1979	53,057,000	12,874,000	772,000	66,703,000
1980	52,321,000	12,820,000	761,000	65,902,000
1981	53,054,000	13,382,000	714,000	67,150,000
1982	51,784,000	12,578,000	622,000	64,984,000

Fibre Distribution of Average Furnish (Selected Years)

Year	Pulp	Paperstock	Other	Total
1942	58.9	34.7	6.4	100.0%
1952	64.1	31.2	4.7	100.0
1962	73.8	23.8	2.4	100.0
1972	79.0	19.5	1.5	100.0
1973	78.7	19.9	1.4	100.0
1974	79.2	19.5	1.3	100.0
1975	80.2	18.6	1.2	100.0
1976	81.1	17.6	1.3	100.0
1977	79.8	18.9	1.3	100.0
1978	78.3	20.6	1.1	100.0
1979	79.5	19.3	1.2	100.0
1980	79.6	19.2	1.2	100.0
1981	79.0	19.9	1.1	100.0
1982	78.7	19.4	0.9	100.00

Source: Bureau of Census

all-time high, up 15% in 10 years, by 54% in 20, and by 121% in 30. Exports have greatly exceeded those figures, of course, with the proliferation of industry in areas previously undeveloped. Overseas shipments of U.S. pulp in 1982 were higher by 57% than in '72, up 199% from '62, and by 1573% from '52.

This reflects the relatively dismal economic scene in many foreign places, where high and rising costs of materials are far above

those we find oppressing. In some non-oil-producing nations, the expenses of operation are so high that some products can be imported from the U.S., including freight, at significantly lower costs than they can be made at home from native or imported raw materials.

However, as may be seen in Table B-2, the volumes of both exports and imports vary greatly with type of pulp. When imports are added and exports subtracted from 1982 domestic pulp production, the new available tonnage, even in a recessive year, was up 11% from 1972, by 80% from '62, and 192% from '52.

Table B-2: High among the evident developments shown by these tabulations of major pulp grades is that U.S. exports of the internationally popular bleached kraft pulp neared another all-time record in 1982, while, as usual, exceeding the export tonnage of all other pulps combined. This popularity goes on, despite a domestic price rise of 155% over the past 10 years.

That cost increase is, of course, a consequence of increased processing expense due to the energy-price escalation, with its incessantly

B-1- Total U.S. Pulp Production, Net Supply, Consumption & Inventories (M short tons)

Period	U.S. Produced	Imported	Exported	Net New Supply	Consumed in Board and Paper	Year End Inventory
1952	18,196	1,937	212	18,196	18,253	711
1962	27,908	2,788	1,186	29,510	28,598	787
1972	46,604	3,726	2,253	48,079	47,347	606
1973	48,355	3,993	2,344	50,004	48,862	678
1974	48,417	4,123	2,808	49,729	48,300	931
1975	40,583	3,078	2,565	41,096	42,620	1005
1976	47,173	3,703	2,518	48,358	48,968	590
1977	46,858	3,864	2,640	48,082	46,704	555
1978	50,375	3,975	2,590	51,755	50,114	433
1979	53,225	4,382	2,791	54,816	53,057	1759
1980	53,319	4,096	3,806	53,530	52,321	448
1981	54,362	3,804	3,677	54,489	53,054	672
1982	52,443	4,299	3,547	53,195	51,784	618

Source: Dept. of Commerce and API

Statistics *continued*

higher costs of making the bleaching chemicals, and of cooking the pulp in them.

The market appeal of bleached pulp is the visual appeal of its converted packagings in a highly competitive area of commerce. A measure of its proliferation is this: In 1972 the net supply of bleached plus unbleached kraft pulp was recorded as 32.7 million short tons, and the bleached portion was 46% of this. In 1982, the combined volume had expanded to 42.67 million tons, an increase of 30%. Of that additional new tonnage in the decade, 78% was in bleached pulp which thus represented more than half of the 1982 net supply, in competition with unbleached pulp for kraft linerboards.

Also visible here is the decline in tonnage of virgin sulfite pulp grades—in part because of their replacement by sulfates for some applications, and in part through

replacement by recycled white-paper furnishes, at relatively low cost. Thus in 1972 the sulfite pulps made up 6% of total net supply in the "principal" grades listed here. In 1982, the proportion has dropped by one-half, to 4% of the total. And of the additional new tonnage generated over that decade, 103% was in sulfate grades.

Predictably, the market price of the sulfite-substitute recycled white papers has gone up in response. Thus, mid-year 1972's mid-continent price for ordinary reclaimed news was \$20 per ton, while that of hard white shavings was \$80. At mid-1982, the news price had risen a seemingly formidable 50%, to \$30—but the price of the pulp-substitute shavings was up 130%, to \$185 per ton.

Table B-3: This, in broad terms, is where the pulp went. Rarely do any very startling events appear in consumption trends, beyond the year-to-year variations in overall economy. But not so the trends in

export of pulps, over three decades of Third World independence and industrialization.

Paper pulp is, of course, an uncomplicated raw material that can be made into a variety of widely used end products by means of basically simple processes with readily acquired skills. As such, it is tailor-made for beginning of self-sufficiency in non-manufacturing areas.

Thus, in 1952, exports of U.S. pulp totaled 212,000 tons, a mere 1% of the total consumption. By 1962, overseas shipments had increased nearly 600%, to 4% of consumption. In 1972, exports were 10 times those of 20 years previously, and in 1982 15 times greater than in '52.

From another view—domestic mill consumption of pulp in 1982 had gone up 10% in the latest decade, 80% in 20 years, and 192% in 30 years. But export tonnage has increased 60% in 10 years, 200% in two decades, and 1500% in three. And, since the overseas conditions

B-2—U.S. Pulp Production, Net, Supply by Principal Paper Grades (M short tons)

(Net supply equals imports plus domestic production minus exports)

UNBLEACHED KRAFT					BLEACHED KRAFT				SEMIBLEACHED KRAFT			
Year	Imported	Domestic	Exported	Net Supply	Imported	Domestic	Exported	Net Supply	Imported	Domestic	Exported	Net Supply
1952	206	6,211	76	6,343	519	2,358	116	2,865	213	769	65	917
1962	237	4,517	102	9,651	1,237	6,784	397	7,623	507	2,213	223	2,497
1972	359	17,286	77	17,568	2,259	12,372	1,073	13,558	214	1,800	240	1,574
1973	368	17,580	71	17,877	2,500	13,228	1,032	14,696	189	1,826	80	1,744
1974	342	16,987	156	17,173	2,586	13,938	1,458	15,066	161	1,421	73	1,509
1975	190	15,227	96	15,301	2,132	12,756	1,379	13,509	104	1,375	87	1,384
1976	249	17,745	113	17,881	2,558	14,291	1,406	15,443	112	1,496	91	1,517
1977	245	15,399	104	18,540	2,588	14,887	1,369	16,106	138	1,538	89	1,587
1978	249	18,609	192	18,746	2,782	17,050	1,809	18,023	132	1,591	93	1,630
1979	258	19,391	199	19,450	2,935	17,987	1,908	19,014	137	1,651	97	1,691
1980	263	19,942	202	20,002	3,355	18,990	2,014	20,331	128	1,704	99	1,733
1981	305	21,133	215	21,223	3,611	20,008	2,048	21,571	119	1,816	96	1,839
1982	283	19,617	199	19,701	3,559	19,722	2,019	21,262	110	1,686	89	1,707

UNBLEACHED SULFITE				BLEACHED SULFITE				SEMICHEMICAL			
Year	Imported	Domestic	Exported	Net Supply	Imported	Domestic	Exported	Net Supply	Domestic	Exported	Net Supply
1952	432	674	35	1,071	499	2,398	75	2,881	829	n.a.	829
1962	144	509	37	616	534	2,056	165	2,424	2,543	n.a.	2,543
1972	100	333	2	431	323	1,796	227	1,892	3,761	n.a.	3,761
1973	147	373	5	515	356	1,920	293	1,983	4,009	5	4,004
1974	121	390	28	483	451	1,914	286	2,079	5,789	18	3,771
1975	60	366	23	403	299	1,659	246	1,712	3,419	9	3,410
1976	76	460	12	524	360	1,748	181	1,925	5,138	4	5,134
1977	57	413	8	462	454	1,656	192	1,918	5,327	4	5,323
1978	45	329	8	386	453	1,429	166	1,716	5,627	10	5,617
1979	39	287	7	319	396	1,248	145	1,499	6,812	12	6,800
1980	32	365	7	390	372	1,449	137	1,684	7,946	14	7,932
1981	29	249	7	371	337	1,389	122	1,604	8,401	15	8,416
1982	33	394	8	419	304	1,254	110	1,448	7,920	14	7,906

Source: Bureau of Census, U.S. Department of Commerce, API. As of Jan. 1975, Census Bureau combines Soda data with Sulfate

Statistics *continued*

that brought about this demand are likely to continue growing, the export market is likely to remain a valuable outlet.

Table B-4: The impact of violent mid-1970s escalation in world petroleum prices is readily traced in corresponding trends for paper pulps, as production costs soar.

For example, it is seen that between 1952 and '62, the ton price for each of these basic grades actually dropped, as manufacturing efficiencies improved. Then, between '62 and '72, the price of unbleached kraft pulp (largest single-volume grade) went up 22%, or a sedate 2.2% per year, while bleached kraft rose 13%. But between 1972 and '82 the price of both bleached and unbleached kraft pulp rose 155%—over 12 times greater than the increase over the decade previously.

In another view: the price of workhorse kraft pulp has increased by 193% over 30 years, and more than nine-tenths of that advance has developed in the latest 10 years.

Similarly, for the other pulp grades shown, the price shifts between 1952 and '72, and the changes since then, are, respectively: for unbleached sulfite, 1.4% and 146%; for bleached sulfite, 4% and 147%; for groundwood, -5% and -186%.

Informed projections are for further price increases averaging around 10% annually in the 1980s.

B-3—Pulp Consumption by End-Uses (M short tons)

Year	Board & Paper Mills	Exports	Non-Paper Uses	Total
1952	17,737	212	755	18,253
1962	28,598	1,186	976	30,760
1972	47,347	2,237	1,115	50,305
1973	48,862	2,344	1,146	52,352
1974	48,517	2,808	1,154	52,479
1975	42,620	2,565	783	45,968
1976	46,968	2,518	1,121	50,607
1977	46,704	2,640	1,097	50,441
1978	50,114	2,599	1,153	53,866
1979	53,057	2,791	1,222	57,070
1980	52,321	3,806	1,186	56,360
1981	53,054	3,677	1,137	57,868
1982	51,784	3,547	1,110	56,441

Source: Census Bureau, U.S. Dept. of Commerce, API

Recovered Tonnages Continue at All-Time High

Paperstock Review

Table C-1: The prompt sensitivity of secondary fibre supply/demand to industry economics is well illustrated in the recovery ratios of recent years. Total recovered tonnages in the latest three years have been at all-time highs, rising and falling precisely in tune with consumption in paper and board, and with identical recovery ratios, though these are far below the 27% ratios prevalent in the 1950s.

This sounds fairly uplifting until it is noted that, over the past 20 years of our greatest economic expansion, the consumption of paper and board went up 56%, but

only one-fifth of the additional material came from reclaimed fibres.

In another view: If all conservation concerns of the past 30 years had only produced a fibre recovery ration in 1982 merely equal to that in 1952, about 3 million additional tons of wastepaper would have been taken.

Thus, the '80s continue in frustration for those whose efforts to conserve usable materials have been directed toward both reduction of the solid waste stream and the recovery of resources. It shows again that an "aroused" public is not enough to overcome factors governing the marketplace.

One strongly encouraging trend, as for many other basic commodities, is that of export demand, which has begun to provide a new outlet for reclaimed paper that is beyond any dependable assessment at the moment.

Further, the expansion thus far is difficult to convey understandably by numbers. One effort would be to calculate that between 1972 and '82 the exported volume was six times greater than that in the 20 years before '72. Another view is that in 10 years the recovered volume went up 22%, while the exported tonnage rose 400%. Another is that in 1982 the overseas shipments exceeded the combined total tonnage in all years between 1952 and '72.

Informed industry economists project that in the absence of some international catastrophe, U.S. exports of paper stock by the end of this decade might well become greater than the total present recovered tonnage, and possibly greater by a considerable margin.

These paper stock receipts by
(continued on page 44)

B-4—Average Yearly North American Pulp Prices (Per Short Ton)

Year	Unbleached Kraft	Bleached Softwood Kraft	Unbleached Sulphite	Bleached Sulphite	Groundwood
1952	\$126.83	\$160.19	\$142.06	\$153.61	\$92.48
1962	118.54	140.37	121.92	136.25	87.50
1972	145.00	160.00	144.00	160.00	87.50
1973	180.00	192.00	170.00	187.00	102.00
1974	185.00	295.00	285.00	292.00	185.00
1975	335.00	353.00	335.00	354.00	200.00
1976	335.00	365.00	335.00	354.00	200.00
1977	335.00	365.00	335.00	354.00	200.00
1978	335.00	365.00	335.00	354.00	200.00
1979	365.00	400.00	375.00	400.00	240.00
1980	365.00	432.00	380.00	420.00	245.00
1981	425.00	465.00	385.00	440.00	250.00
1982	442.00	470.00	430.00	440.00	250.00
1983 1st half	372.00	408.00	354.00	395.00	250.00

Suppliers announced contract levels—not necessarily the actual selling price.

Statistics *continued*

mills are augmented by significant tonnages entering into products such as roofing materials, molded pulps, wallboard facings, shredded insulation and other non-paper uses. Hence, the actual recovery ratio is a few points higher.

Table C-2: Mill consumption of reclaimed fibre in 1982 was down less than 1% from '81, and off 4.6% from 1978's all-time high, though up 8% from 10 years ago, 40% from 20 years, and 60% from 1952. Of the 1982 total, almost all was consumed.

This might seem to suggest that adequately limitless supplies are waiting in the wings of inventory to meet any increase in demand that might arise. That confidence may not be borne out, if occasion should appear.

Actually, the mill-inventory tonnages shown are not fully relevant, since suppliers' stocks are not reported to the compiling centers, though they remain available for mill demand. The desirability of a reporting service for those inventories may be seen in the wide fluctuations of boxboard demand.

It is not at all unusual for boxboard orders to vary nationally by hundreds of thousands of tons from one week to the next. Contending with this matter calls for either the maintaining of costly surplus inventories at mills or dealers, or both, or else a hasty short-leadtime scurrying about for extra supplies,

C-1 — Paper Stock Recovery vs. Board/Paper Consumption (M tons)

Year	Board and Paper Consumption	Mill Paperstock Receipts	Exports	Total Recovered	Paperstock Recovery Ratio
1952	25,234	7,815	142	7,881	26.9
1962	42,208	9,076	210	9,360	22.2
1972	64,022	11,703	415	12,118	19.0
1973	67,337	12,254	683	12,947	19.2
1974	65,452	12,438	1,307	13,745	21.0
1975	55,907	10,228	861	10,904	19.5
1976	59,480	10,206	1,273	10,881	18.3
1977	65,226	10,279	1,544	10,959	16.8
1978	63,440	13,191	1,589	14,064	20.5
1979	60,929	12,985	2,139	14,245	20.4
1980	68,584	12,712	2,717	15,429	22.5
1981	69,667	13,480	2,213	15,693	22.5
1982	65,964	12,670	2,127	14,797	22.5

Source: Bureau of Census Forest Products & Pkg. Div. BSDA

C-2 — Paper Stock Movements and Stocks (M short tons)

Year	Mill Receipts	Mill Consumption	Mill Inventories	Imports	Exports
1952	7,815	7,881	522	71	142
1962	9,076	9,075	571	67	210
1972	11,703	11,847	620	68	415
1973	12,264	12,374	516	87	683
1974	12,438	112,106	848	89	1,307
1975	10,228	10,345	731	72	861
1976	10,206	10,187	770	106	1,273
1977	10,279	11,071	723	148	1,544
1978	13,191	13,178	741	127	1,589
1979	12,985	12,871	584	170	2,139
1980	12,712	12,620	818	164	2,717
1981	13,480	13,382	979	137	2,213
1982	12,670	12,578	978	135	2,217

Source: Bureau of Census and U.S. Department of Commerce

or else a delay in filling orders—none of which is desirable.

One way to avoid this would be the cooperative establishment of regional supply centers, at which to maintain moderate inventories of those secondary grades most sub-

ject to wide fluctuation in demand—with the availability of these supplies reported to, and recorded by, a central agency for quick reference when stocks are suddenly needed. This plan has been considered before, and the trend of the industry's quick-service developments is increasing the likelihood of its being adopted, before very long.

Table C-3: A trend to be noted in these end-uses for reclaimed-fibre consumption is the marked increase in tonnage entering paper grades, compared with that going into paperboard and the miscellaneous products.

Specific comparisons are that since 1972 the total volume consumed rose by about 8%, and since 1962 by 40%. The tonnage recycled into paper grades 20 years ago was 13% of total; in 1982 it was 22%. But of the additional volume consumed in 1982 over '62, some 46% went into paper, rather than board/miscellaneous.

The increase in volume entering

C-3 — Consumption of Paperstock by End-Use (M short tons)

Year	Paperboard incl. Wet Machine	Paper incl. Newsprint	Construction Grades, Molded Pulp and Other	Pulp Mills	Total
1952	8,993.5	1,757.2	734.5	n.a.	7,881.2
1962	6,977.0	1,179.7	899.0	n.a.	9,075.0
1972	8,080.0	2,438.0	1,693.0	n.a.	11,847
1973	8,909.3	2,608.5	856.2	n.a.	12,374
1974	8,716.3	2,841.3	745.4	n.a.	12,106
1975	7,448.4	2,172.5	147.0	n.a.	10,345
1976	7,320.2	2,195.1	711.7	n.a.	10,206
1977	7,971.0	2,324.9	775.1	n.a.	11,071
1978	8,489.3	2,767.3	822.7	n.a.	13,178
1979	9,367.0	2,802.8	701.2	n.a.	12,871
1980	8,183.3	2,748.1	889.5	n.a.	12,620
1981	9,841.7	2,945.1	595.2	n.a.	13,382
1982	8,760.4	2,798.2	580.4	n.a.	12,578

Source: Census of Manufacturers, API Capacity Report
n.a.—not available. *API annual Capacity Survey, Nov. 1974

Statistics *continued*

paper types may be attributed largely to rising use for recycled newsprint, as well as the diversion of much reclaimed news into cellulosic insulation materials.

Consumption in new newsprint is very likely to expand comfortably through the foreseeable future. A look at Garden State Paper Co., operating two 100,000-tons/day recycling mills in New Jersey and California, a similar-size joint venture mill in Chicago, and a 155,000-ton facility in Georgia, shows the economics of these mills are firmly based on rising production costs for virgin newsprint, with the recycled paper reported to be equal or preferable for machine handling and print surface.

The latter's raw material is abundant nationally at a price perhaps one-eighth that of the finished product. This margin is a dependable cushion against the ever-escalating process costs confronting primary newsprint mills.

However, the outlet for reclaimed news in cellulosic

C-4 — Ratio of Paperstock to Total Fibrous Materials Consumed in Board & Paper Production (M short tons)

Year	Woodpulp	Paper Stock	Other Materials*	Total	Paper Stock Percent of Total
1962	18,631	7,881	1,300	29,088	31.2
1962	28,598	9,075	963	38,636	23.5
1972	47,947	11,703	892	59,942	19.5
1973	48,899	12,374	883	62,156	20.0
1974	48,300	12,106	827	61,233	19.7
1975	42,820	10,345	587	53,552	19.3
1976	46,968	10,167	760	57,895	17.6
1977	46,704	11,071	627	58,402	19.0
1978	50,114	13,178	741	64,033	20.6
1979	53,057	12,871	723	66,651	19.3
1980	53,421	12,620	566	66,529	19.0
1981	57,054	13,382	1,056	67,492	19.8
1982	51,784	12,578	622	64,984	19.4

Compiled from Census Bureau Reports, API.
*Linter pulp, straw bagasse, etc.

insulation is also more favorable, with a potential estimated at perhaps 1 million tons per year.

The imposition of new national standards for quality has restored its reputation as a safe, low-cost product of satisfactory performance, and the renewed market for cellulosic insulation materials may be expected to expand.

The declining "other product" consumption—down 65% in the

decade—may be attributed largely to successful invasion by alternate materials in applications held earlier by molded pulp. An example is the foamed-plastic egg carton.

However, the fact that this decline has not been greater is due to rising use of paper in construction materials—observe the minimal tonnage consumed in depressed 1975. In any case, these "other" end uses are seen to take

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Statistics *continued*

only about 5% of the reclaimed paper fibre.

Table C-4: The utilization of reclaimed fibre in manufacture of paper/board materials seems to have petrified at an average around 19% of ingredients.

It may be seen that although the actual tonnage of paper stock is up 23% from a decade ago, it cannot be called flourishing. Thus, of the increase since 1972, some 88% was in virgin woodpulp.

In short, a highly limited effect has been generated by the widely publicized recent-years' appeal for greater recovery of resources, and by the intensive research into utilization of non-wood fibres.

Those include the sugar-cane bagasse, banana stalks, linters clinging to cotton seeds after the first ginning, fast-growing grasses such as kenaf, and the like, along with a number of high-volume residues from ongoing industrial processes—not merely the agricultural products alternative to wood fibre.

The picture begins to appear that, as in the case of our natural gas and petroleum supplies, we will not turn to the available alternate paper fibre supplies until there is no other choice. And then that choice will be considerably less comfortable than it would have been in the days when it was voluntary.

Table C-5: These price ranges show the highs and lows, in the year ending mid-1983, for basic paper stock grades in representa-

C-5 — Domestic Paperstock Price Ranges Per Ton — 1982-1983

Based on transactions during 1982 and Jan.-June 1983
For current prices see Official Board Markets
Mill prices F.O.B. cars or trucks. All prices in bales — bales 500. min.

	Jan. June 1982-1983 New York	Jan. June 1982-1983 Chicago	Jan. June 1982-1983 Southeast
No. 1 Mixed Paper	\$5-7	\$7.50-15	\$5-15
No. 1 Baled News	5-40	25-45	30-40
Old Corrugated Boxes	10-50	25-60	20-60
Boxboard Clippings	20-25	25-35	20-40
White Ledger	60-75	60-90	55-65
Dbl. Ld. Kraft Corr. Clippings	East	Midwest	Southeast
Semichem .009 Medium	\$37.50-77.50	\$37.50-77.50	40-80
Mixed .009 Medium	32.50-72.50	32.50-72.50	35-75
Hard White Shavings	180-210	180-210	180-210
Man. Tab. Cards	220-255	220-255	200-255
White News Blanks	65-90	65-90	65-90

Source: Official Board Markets

tive areas, as reported to *Official Board Markets* by mills and dealers there.

The gradual fading of market demand, and thus of price, is evident here for such high-volume, formerly prominent grades as mixed paper, as compared with the high and rising prices of high-grade pulp substitutes.

The reason for both is the higher cost of processing. Recent-years' explosion in cost of energy, labor, and transport has elevated processing expense beyond the end-use value for these low-grade fibres. "Mixed paper," for example, is a heterogeneous mix which, given moderate sorting and cleaning, once provided an acceptable base for many low-grade end products. But low-cost is gone forever.

On the other hand, prices for the better qualities of generator scrap, such as need little or no processing before pulping, have been going up and up in multiples.

For example, 10 years ago the typical Chicago-area price for mixed paper was around \$12 per ton, with a \$77.50 range for hard white shavings. At mid-1983, the value of mixed had dropped, while the shavings were up 150%, because of their ability to replace some costly virgin pulps.

This disparity can only widen in the future, for two major reasons. One is the inevitable increase in processing costs. The second is the rising production of good-quality, end-use, high-volume white papers generated in the rapidly expanding data-processing area.

"Minority" Boards Expand in '82

Paperboard Mill Review

Table D-1: Production of U.S.

D-1 — Paperboard Mill Production by Grades (tons)

Grades	1952	1962	1972	1980	1981	1982
Other (Jute) Liner	772,700	701,800	278,900	444,500	324,200	279,000
Kraft Liner	2,910,100	5,514,700	10,577,600	11,948,600	12,754,300	11,656,500
.009 Semichemical	1,057,200	2,188,800	3,874,200	4,398,500	4,561,200	4,202,500
Recycled Medium	588,600	633,300	972,300	1,047,199	1,140,900	1,139,500
Chip & Filler	329,000	260,400	315,900	231,500	259,500	230,200
Total Containerb'd	5,637,000	9,299,000	16,018,900	18,070,200	19,040,100	17,507,500
Folding boxboard	2,341,800	3,120,600	4,396,300	4,494,600	4,587,600	4,333,700
Set-up Boxboard	635,300	523,800	455,100	241,500	236,000	223,600
Milk/Food Board	834,600	1,620,800	1,699,600	1,421,700	1,392,500	1,283,700
Total Boxboard	3,811,900	5,265,200	6,551,000	6,157,800	6,216,100	5,841,000
Other	1,755,400	3,283,200	5,932,500	5,724,200	5,076,100	5,716,800
Grand Total	11,045,500	17,847,400	28,502,500	30,952,300	31,232,200	29,065,300

Source: American Paper Institute

Statistics *continued*

packaging paperboard in 1982 was down 6.9% from the previous year, compared with an annual average rise of 2% since 1972, and of 6% in the 1962-72 years. The grades listed are those tabulated by the American Paper Institute, and exclude non-packaging boards listed by the Census Bureau, as noted earlier.

A continuing trend is the expansion in "minority" board types, such as the recycled medium and chip/filler grades, which had been in eclipse for many years, giving way under the advance of premium-grade kraft. Thus, the 1982 tonnage of recycled corrugating medium is up 17% in the decade, precisely double the 8.5% advance for semichemical.

This reflects the greatly improved technologies in reprocessing of the secondary fibres, so as to retain their qualities of strength. The proportions in reclaimed fibres now permissible in linerboard and other high-quality grades would have produced only second-rate boards until very recent years. Now, the tonnage of recycled fibre entering into primary products is far higher than it ever was in the days of the

crude, non-test "jute" materials.

Unfortunately, the tonnage of packaging boxboards is actually 10% lower than it was 10 years ago—the decline being in milk/food service and setup boards. This reflects the extent to which many paperboard applications have been taken over by "convenience" materials such as film bags, plastic beverage containers, foamed-plastic boxes, and the like.

At the same time, it is seen that much of this lost tonnage is unidentified as packaging material, but has reappeared in the "other" category, which now very nearly approaches the total volume of boxboard.

This "other" material is entering specialty applications such as the shrink- and stretch-packs, composite cans, and other variations on the "square box" theme, but in which the board consumed is not tabulated by any industry agency. Thus, the board is not actually lost to packaging, but is simply not being identified with the basic package types.

Table D-2: The worldwide economic recession of recent years has brought about a decline in U.S. paperboard exports—down 26% in 1982 from the all-time high of 1980. The total last year, however, was

up by 280% from 20 years ago, and 1300% from '52.

This depicts the rising overseas demand for our raw materials, many of which can be bought abroad for less than cost of production there.

The foreign demand is seen to vary greatly by grade. Thus, 11% of 1982's containerboard production (see Table D-1) was shipped away, compared with 5% of the boxboard tonnage. In fact, the popularity of U.S. containerboards with overseas converters may pose a significant effect on available domestic supply.

It will be seen that 1982 produced 8.2 million more tons of containerboard than did 1962, but 18% of that additional tonnage was exported. Over those 20 years, the gain in tonnage available to U.S. converters was 88%, but the consumption of fibre boxes went up 105%.

With this slow attrition on domestic supply, and with very little new capacity construction scheduled, the predictions of paperboard shortages in some grades, following return to economic recovery, may prove to be well founded.

Table D-3: The grades listed are

D-2 — Paperboard Exports (tons)

Grades	1952	1962	1972	1978	1980	1981	1982
Containerboard	92,851	489,380	2,158,200	2,304,300	2,693,600	2,105,100	1,959,200
Boxboard	23,129	87,849	140,700	304,200	399,500	322,600	300,200
Building Board	24,737	21,910	69,700	53,000	56,600	47,100	43,800
Card Board	8,549	8,944	30,600	81,100	93,200	89,200	83,100
Other Paperboard	24,378	43,811	82,600	166,000	86,500	83,300	77,500
Total	173,844	651,894	2,481,800	2,910,600	3,329,400	2,647,300	2,463,700

Source: U.S. Dept. of Commerce BDSA.

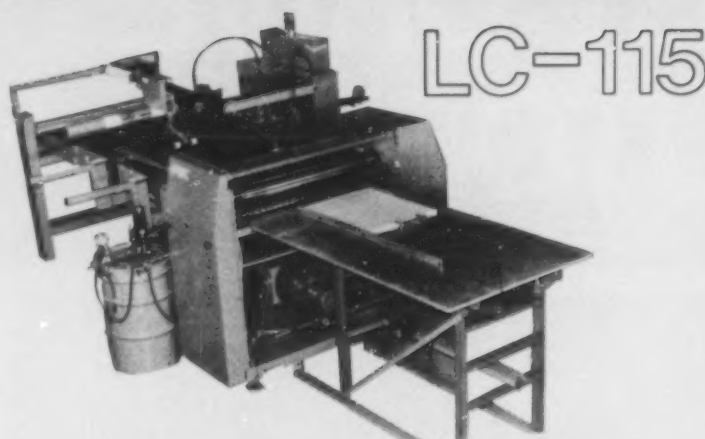
D-3 — Folding & Set-up Boxboard Production (tons)

Grades	1952	1962	1972	1978	1980	1981	1982
Unlined Chipboard	423,500	505,100	92,400	46,700	44,900	45,800	91,100
Lined Chip	429,900	831,000	1,059,500	1,164,700	1,105,7700	1,055,100	1,044,400
Patent Coated	494,500	550,500	646,200	713,100	683,200	683,500	637,000
Clay or Other Coated	214,800	767,000	1,776,100	1,983,800	1,996,400	2,050,600	1,750,800
Other Folding	488,400	466,400	822,100	636,800	664,400	752,600	850,400
Total Folding	2,551,100	3,120,600	4,396,300	4,706,600	4,494,600	4,587,600	4,333,700
Newslined Chip & Solid News	605,100	385,100	402,950	310,700	225,600	220,500	208,900
Other Lined & Unlined Chip	52,100	191,300	121,320	82,300	59,700	55,400	55,300
Other Set-up	- 21,900	- 52,600	- 89,170	- 60,300	- 43,800	- 42,900	- 40,600
Total Set-up	635,300	523,800	485,100	332,700	241,500	236,000	223,600

Source: Grades are Bureau of Census. Totals of folding and set-up are American Paper Institute. Other folding and other set-up are balancing figures.

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Statistics *continued*

as recognized by the U.S. Bureau of Census, adjusted to American Paper Institute total by the "other" figures.

Set-up boxboards in 1982 continued their decline as a major element in the paperboard packaging field, down 665% in tonnage from 30 years ago, and now representing less than 5% of the combined folding/set-up total, compared with 20% in 1952. To some extent, this drop in tonnage is due to development of the lighter, stronger boards, and thus is not a direct reading of footage.

The trend continues toward use of lighter-colored, smoother, more machinable boards. For example, the "clay- and other-coated" tonnage in 1982 was 40% of the folding total, compared with 25% in 1962.

Table D-4: The 1982 mill activity ratio—simple proportion of actual production to projected capacity—was at its second-lowest level in the industry's history, higher only than the semi-paralysis of 1975.

However, mid-year 1983 finds production up nearly 6% from '82—and containerboard output up 7%—with no corresponding increase in scheduled capacity. A similar encroachment on available capacity occurred in vigorous 1973, with some regrettable results in the postponed maintenance of major machinery.

However, at that time the nation at least had a fairly substantial influx of new capacity about to go on-stream. That is not the case now, and in absence of another economic downturn the future may hold sharp shortages in some board grades.

Table D-5: On the basis of existing construction commitments, U.S. capacity for the packaging paperboards (omitting wallboard facing and the "other") will expand by 0.3% between 1982 and '84, comprising a minuscule drop for containerboard grades and a 1.5% increase for boxboards. This is far below a typical average, and is only one of the evidences of plans for revision in recent years.

Many of these seeming contradictions and inconclusives arise from the constant intrusion of wholly new problems into the

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Statistics *continued*

economy, so that the best-laid plans of today may become precarious tomorrow.

With basic costs of construction more than tripled in a half-dozen years, with outstripping improvement in product price, and with vast advances in operating expense, many growth plans are being deferred, and their retrievals are cautious.

Corrugated Consumption Slows in '82

Corrugated/Solid Fiber Review

Table E-1: Box plant production of corrugated plus solid fibre in 1982 (without deduction for scrap conversion) was down 2.6% from '81 and by 8.7% from all-time high '79, though up by 11.7% from 1972, by 95% from '62, and by 221% from '52.

It will be seen that the average-year increase in consumption of these materials is slowing, as they have taken over a near-complete share of the market for long-distance shipment packagings.

Thus, the average annual expansion of tonnage between 1952 and '62 was 6.5%, which became 7.4% between '62 and '72 as the shift quickened to corrugated from alternate materials. But between '72 and '82 the average has subsided to less than 1% per year, as

D-4 — Board Mill Capacity & Utilization (tons)

Year	Capacity— American Paper Inst.	Utilized (Production)	Activity Rate	Unused— Excess Capacity
1952	12,999,400	11,049,500	86%	1,949,900
1962	19,399,300	17,847,400	92	1,551,900
1972	29,324,000	26,502,500	97	939,700
1975	32,951,000	24,717,300	75	8,237,700
1976	32,338,000	26,439,100	88	3,899,000
1977	32,568,000	28,953,100	89	3,974,900
1978	33,332,000	30,274,900	91	3,024,200
1979	33,559,000	31,428,900	93	2,130,100
1980	33,788,000	30,952,300	92	2,835,700
1981	34,245,000	31,232,200	91	3,012,800
1982	35,501,600	29,065,300	82	6,435,700

Source: American Paper Institute. Capacity is obtained by dividing production by activity rate (X100).

D-5 — Future Board Capacity, Existing Commitments

(313-day basis, at year end, M tons)

	1981	1982	1983	1984
Kraft Linerboard	15,391	16,086	16,307	16,157
Comb. Linerboard (Jute)	404	547	560	614
Semichemical Medium	5,009	5,180	5,477	5,479
Other Medium	1,526	1,385	1,415	1,479
Container Chip	320	286	287	295
Total Containerboards	22,650	23,483	24,046	24,024
Bending Board	5,707	5,366	5,410	5,484
Non-Bending Board	427	352	362	333
Bleached Linerboard	138	108	108	103
Other Bleached Packaging	1,918	1,794	1,786	1,872
Other Bleached	206	228	230	223
Total Boxboards	8,396	7,848	7,896	8,015
Wallboard Facing	1,301	1,269	1,285	1,292
All Other Board	3,092	2,281	2,304	2,302
	4,393	3,550	3,589	3,594
Total Paperboard	35,439	34,881	35,531	36,175

Source: American Paper Institute, Inc.

corrugated saturates the market.

The same is shown in cyclic patterns of advance and retreat over the past decade. There were five years up in tonnage, and five down, with the average annual footage advance stuck at precisely the

period's midpoint.

This depicts a basically mature industry, responsive to temporary peaks and valleys of economy, but unlikely to develop either a major unexpected expansion or a

(continued on page 58)

E-1 — Annual Fibre Box Plant Production (tons & M sq ft)

Year	Corrugated		Solid Fibre		Total	
	Tons	M Sq Ft	Tons	M Sq Ft	Tons	M Sq Ft
1952	5,303,300	74,595,400	368,700	2,345,100	5,672,000	76,940,500
1962	8,625,500	125,741,700	194,900	1,247,600	8,820,400	126,989,300
1972	15,030,800	220,109,600	158,600	1,116,300	15,189,400	221,225,900
1973	16,284,500	236,918,900	161,900	1,139,300	16,446,400	238,058,200
1974	15,284,300	224,534,200	144,500	1,016,700	15,428,800	225,550,900
1975	13,860,800	203,230,200	114,600	806,600	13,975,400	204,036,800
1976	15,667,100	227,817,700	122,200	859,800	15,667,100	228,677,500
1977	16,337,200	238,800,900	126,900	893,100	16,464,100	239,694,000
1978	17,541,250	256,400,900	131,100	922,400	17,708,700	257,323,300
1979	18,159,700	261,072,000	137,400	966,600	18,159,700	270,738,000
1980	17,489,500	251,939,000	129,400	910,200	17,618,900	252,849,200
1981	17,821,200	253,032,000	119,800	842,500	17,941,000	253,874,500
1982	17,717,900	246,298,000	128,300	902,000	17,846,200	247,191,000

Source: Fibre Box Assn. Production is at end of combiner, without deduction of box shop waste. Tons represent board consumed.

Statistics *continued*

shrinkage in use.

Another evidence of "maturity" seen here is the leveling off of corrugated weight per unit area, as kraft liners and semichemical medium almost entirely replace the diversity of old, heavier containerboards. Thus, in 1952 one ton of board yielded 14,066 sq ft of corrugated; in 1962 it had become 14,578 sq ft and in '72 was 14,644 sq ft. This dropped to 14,100 in 1982, reflecting the greatly increased production of double- and triplewall corrugated, over the decade.

Table E-2: A 4.5% drop from '81 brought the 1982 shipped footage of corrugated and solid fibre products to the lowest total in five years, 6.2% below the all-time high of '79, and only 3% above 1973. Of this total, 99.6% was corrugated.

Total shipped value was history's second highest, down 6.7% from the previous year but up 136% from 1972, by 367% from '62, and 690% from '52. Average square-foot volume was also a second-best for both fibre types.

It may be seen that the 11% increase in corrugated shipments since 1972 is about one-twelfth of the increase in unit value. This promises an industry income advance well below the rate of inflation in other basic commodities over those years.

On the other hand, the value advance did respond to the ramifications of escalating energy cost that began in 1973, with the sudden explosion of world petroleum prices.

Thus, of the 23.4 billion sq ft increase in shipments between 1972 and '82, an expectable 50% appeared in the first five of these years. But of the \$21 value increase

per MSF between '72 and '82, some 62% appeared in those years, which followed the first "crunch" in oil prices.

The footage of solid-fibre materials, though now only 0.4% of total shipments—about one-quarter of the proportion in 1962—continues to maintain a stable and even upward volume in recent years. This suggests that there remain some applications in which solid-fibre products are not adequately replaced by alternate materials. It also substantiates the expanding popularity of reusable solid-fibre slip-sheets for separating stacks of various converted products shipped on skids, but not baled.

Table E-3: The acceptance of fibre containers in the national economy may be calculated clearly from the comparable increase in U.S. population, along with our per-capita box consumption.

E-2 — Corrugated & Solid Fibre Shipments (M sq ft & value)

Year	Total M Sq Ft			Total Value			Average Value per M Sq Ft		
	Corrugated	Solid Fibre	Total	Corrugated	Solid Fibre	Total	Corrugated	Solid Fibre	Total
1952	72,328,20	2,273,600	74,601,800	\$1,111,010,600	\$70,841,300	\$1,181,851,900	\$15.36	\$31.16	\$15.84
1962	120,994,000	1,187,200	122,181,200	1,956,573,300	43,842,200	2,000,415,000	16.17	36.93	16.37
1972	210,879,800	1,046,300	211,926,100	3,919,882,900	40,061,600	3,959,924,500	18.59	38.29	18.69
1973	226,984,300	1,067,900	228,052,200	4,815,486,600	46,569,700	4,862,056,300	21.22	43.61	21.32
1974	215,119,000	953,000	216,072,000	5,742,301,300	50,683,500	5,792,984,900	26.69	53.18	26.81
1975	193,573,100	756,100	194,329,200	5,578,612,500	45,152,700	5,623,765,200	28.82	59.72	28.94
1976	215,564,600	806,600	216,371,200	6,395,870,800	8,067,500	6,443,938,300	29.67	59.64	29.78
1977	226,359,700	837,800	227,197,500	6,691,170,000	50,574,100	6,741,744,100	29.56	60.37	29.67
1978	242,998,100	898,900	243,897,000	7,204,311,000	55,786,300	7,260,097,300	29.65	62.06	29.77
1979	249,701,000	942,000	250,643,000	8,344,624,600	63,269,400	8,407,984,000	33.42	67.16	33.55
1980	240,490,000	888,000	241,378,000	9,010,411,800	6,970,200	9,075,381,800	37.47	74.08	27.60
1981	245,331,000	821,000	246,152,000	9,956,771,000	62,750,200	10,019,521,200	40.59	76.43	40.70
1982	234,306,000	879,000	235,185,000	9,278,984,700	64,630,200	9,343,619,900	39.60	73.53	39.73

E-3 — Per Capita Shipments, Corrugated & Solid Fibre

Year	Per Capita Consumption — Sq Ft			
	Midyear U.S. Population	Corrugated	Solid Fibre	Total
1942	134,656,078	288.0	27.2	315.2
1952	157,028,000	460.6	14.5	475.1
1962	185,951,000	648.5	6.4	654.8
1972	208,842,000	1009.8	5.0	1014.8
1974	211,909,000	1015.1	4.5	1019.6
1975	213,641,000	906.1	3.5	909.6
1976	214,659,000	1004.2	3.8	1008.0
1977	216,383,000	1046.1	3.9	1050.0
1978	218,228,000	1111.4	4.1	1115.5
1979	220,099,000	1134.5	4.3	1138.8
1980	223,174,000	1077.6	4.0	1081.6
1981	226,292,000	1084.1	3.6	1087.7
1982	230,547,000	1066.3	3.9	1072.2

Source: Based on Fibre Box Assn. and Bureau of Census data.

E-4 — Grades of Corrugated Board Production (M sq ft)

Year	Single Face	Double Face	Double and Triple Wall	Total
1952	1,566,500	69,224,500	3,804,500	74,595,400
1962	1,415,500	116,832,800	7,493,400	125,741,700
1972	1,566,500	200,902,100	17,640,900	220,109,500
1973	1,490,000	216,841,400	20,195,800	238,527,200
1974	1,492,200	203,448,600	19,153,800	224,094,600
1975	1,165,500	186,172,400	15,892,300	203,230,200
1976	1,305,200	207,879,800	18,632,700	227,817,700
1977	1,216,500	217,183,800	20,400,600	238,800,900
1978	1,265,000	232,827,000	22,309,000	256,401,000
1979	1,166,000	236,670,000	23,236,000	261,072,000
1980	1,144,000	229,054,000	21,741,000	251,939,000
1981	1,126,000	229,808,000	22,098,000	253,032,000
1982	1,118,000	224,180,000	20,921,000	246,289,000

Source: Fibre Box Assn.

E-6 — Fibre Box Plants, Equipment, Investment, Employees

	1952	1962	1972	1976	1977	1978	1979	1980	1981	1982	1983
Converting Plants	338	434	614	654	671	690	676	669	666	652	644
Sheet Plants	254	422	710	775	815	857	854	848	842	814	771
Total Plants	592	856	1,324	1,429	1,516	1,537	1,530	1,517	1,508	1,466	1,415
Dbl.-Face Corrugators Operated	402	515	662	744	755	768	760	754	754	747	739
Dbl.-Face Corrugators Total Trim	29,582"	39,622"	52,960"	60,781"	61,774"	62,811"	62,424"	62,209"	62,175"	61,020"	60,938"
Pasters Operated	52	39	33	37	36	36	36	34	33	32	30
Pasters Total Trim	4,494"	3,197"	2,736"	3,055"	3,005"	3,005"	3,0005"	2,857"	2,737"	2,654"	2,488"
Total Companies	431	477	732	819	875	894	884	879	877	853	819
Est. Investment (MM\$)	\$ 273.0	\$ 541.0	\$1,055.9	\$1,192.6	\$1,272.5	\$1,334.9	\$1,426.1	\$1,588.7	\$1,646.5	\$1,515.9	\$1,503.6
No. Employees	40,200	55,900	98,440	111,370	117,860	119,810	119,120	118,110	114,200	112,100	98,400

Source: Plant and machine data from **Official Container Directory**; investment estimated; employment from Fibre Box Assn. A converter must operate complete corrugators or pasters to be so classed; one operating only single facers is classed as a sheet plant (one who buys combined board from converters). Companies represent entities, ignoring influence of subsidiaries, affiliates or parent relationships, non-operating parent companies not counted.

In the 1972-82 decade, population went up 10.4% and individual box demand 20%. Since 1962—23% more people, and 65% more boxes for each. Since '52—47% more people, 132% more boxes. Since 1942—71% more people, 271% more boxes for each. In short, since World War II, the per capita use of shipping containers has gone up nearly four times as fast as the number of "capitas" using them.

That, in turn, reflects the vastly improved standards of daily living made possible by the protection provided in long-distance shipping of exotic consumer products.

As a result, the average citizen in 1982 spend \$40.53 for his share of fibre containers. The individual expenditure was \$18.96 in 1972—\$10.70 in '62, and \$8.78 in '52.

With all allowance for inflation, improved marketing, and better distribution techniques, it seems unlikely that many basic commodities have achieved a more-than-doubling of personal expenditure over the past 10 years, and a tripling over the last 20.

A fortunate effect of this for the box industry is that it offsets the decline in birth rate of new customers. Between 1942 and '52, for example, the average annual increase in U.S. population was 1.7%—nearly double the rate in 1972-82. But over those same decades, the annual individual box use rate has more than doubled.

Table E-4: The protective value of corrugated containers, even for the heaviest-duty applications, is seen in the recent-years expansion of double- and triplewall board, compared with conventional double-face. Thus, though the latter's volume still made up 91% of the 1982 total footage, and was up 16%

E-5 — Corrugated & Solid Fibreboard Consumption (tons)

Year	Kraft & Jute Liners	.009 Corrugated Materials	Liner & Filler Chip	Total
1952	3,767,300	1,659,300	295,400	5,722,000
1962	5,912,200	2,716,500	191,700	8,820,400
1972	10,334,600	4,697,700	157,100	15,189,400
1974	10,621,200	4,746,200	61,400	15,428,800
1975	9,609,100	4,320,200	46,100	13,975,400
1976	10,782,000	4,844,400	50,700	15,677,100
1977	11,318,300	5,102,500	43,300	16,464,100
1978	12,168,400	5,949,700	45,600	17,708,700
1979	12,456,000	5,654,500	9,200	18,159,700
1980	12,016,500	5,427,400	43,600	17,487,500
1981	12,262,400	5,530,400	28,400	17,821,200
1982	11,751,300	5,337,400	29,200	17,117,900

Source: Fibre Box Assn.

from 1972 and 92% from '62, production of the heavy-duty materials rose 43% from '72 and 180% from '62.

From another standpoint: Although double- and triplewall corrugated made up only 8.5% of the 1982 footage, and 6% in 1962, their proportion of the additional footage since '62 has been 11% of total new volume.

Production of single-face corrugated also has been remarkably stable for two decades, considering the great variety of newer cushioning products, such as foamed plastic modules. The footage of single-face in 1982 remained at more than 70% of its volume of 30 years ago. It appears that there are some applications for which the particular features of this material are not replaced satisfactorily by alternate cushionings, while at the same time it has little or no appeal for use in new applications.

Table E-5: Clearly evident here is the recent years' replacement of non-kraft containerboards by new primary materials. In 1952 (not shown) nearly 50% of all boards

entering into U.S. corrugated/solid fibre products comprised the jute, cylinder, straw, chip, and similar grades. By 1962 this had been reduced to a mere 3%, and by '82 to a minuscule 0.2% of total tonnage.

With this virtual disappearance of the heavier boards, the footage produced in 1982 was 230% greater than in 1952 and 69% up from '62, while the tonnage of board consumed was only 199% higher, respectively.

However, it may well be that a reversal is about to appear in the decline of these ancient secondary grades. The ability of existing primary board mills to meet corrugated demand in a normal economy—which we must assume is coming—will be very nearly 100% of their capacity. The modernization of in-place equipment has been completed to a practical maximum.

Yet little new containerboard capacity is under construction, because of exorbitant costs. It is realistic to project that primary tonnage will be fully absorbed in the foreseeable future, and that the available non-kraft capacity will have to be revived.

Statistics *continued*

Table E-6: For the fifth consecutive year, reductions appeared in the number of operating corrugated combiner plants, sheet plants, and total companies, according to listings in our *Official Container Directories*.

Between mid-1982 and mid-'83, eight U.S. converting plants and 43 sheet plants were closed, and 34 companies left the lists. The disparity between 51 plant closings and 34 company closings suggests that the economic attrition has been significantly more marked for independent operations than for integrated facilities.

Continuing also, however, is the rise in productivity of the average plant. In 1962, the 434 combiner plants recorded produced an average of 289 million sq ft of corrugated board. The average reached 358 million in 1972, and 382 million last year. Thus, the average converting plant production was up 17% in the decade, and 32% from the level of 20 years ago.

Lighter Materials Replace Heavy Boards

Folding Carton Review

Table F-1: The tonnage of boxboards entering into folding carton conversion in 1982 was down 1.7% from the previous year, and 5.1% below the all-time high of 1979. In fact, the '82 tonnage was up only 3% from 10 years ago, and less than 13% from 20 years ago.

F-1 — Folding Boxboard Consumed (tons)

1967 — 100		
Year	Tons	Index
1962	2,407,300	77.7
1962	2,859,000	130.3
1972	3,117,000	100.6
1973	3,227,000	104.2
1974	3,180,000	102.0
1975	2,938,000	94.8
1976	3,200,000	103.3
1977	3,258,000	105.2
1978	3,375,000	108.9
1979	3,393,000	109.5
1980	3,311,000	106.9
1981	3,274,000	105.7
1982	3,219,000	103.9

Source: Paperboard Packaging Council

These direct comparisons may be a bit misleading, since a portion of the old heavy boards has been replaced, in recent years, by lighter materials that offer greater area per ton. A rough estimate of this replacement might be made from Table F-3.

In any case, the recent-years' decline of expansion rate for the folding cartons shows clearly the success of other materials, such as plastics, and of other treatments, such as "shrink" packs, in replacing small paperboard boxes.

For another comparison—in the 10 years ended 1982, the tonnage of corrugated containers went up 18%, compared with the 1.3% for folding cartons. And, in the two decades beginning 1962, corrugated board consumption tonnage rose 105%—more than eight times the percentage increase for cartons.

An even more striking comparison is in relative per-capita consumption of the folding cartons and the corrugated containers. Twenty years ago, the average U.S. citizen

F-2 — Folding Carton Shipment Value

Year	Dollars (1000)	Tons	Average Value/Ton
1962	\$700,743	2,190,800	\$319.89
1962	952,200	2,315,900	411.15
1972	1,330,000	2,525,000	526.73
1973	1,480,000	2,614,000	558.53
1974	1,664,980	2,531,721	669.50
1975	1,755,000	2,380,000	737.39
1976	1,979,000	2,592,000	763.50
1977	2,100,000	2,639,000	797.65
1978	2,278,000	2,734,000	833.21
1979	2,435,000	2,748,000	886.10
1980	2,620,000	2,662,000	976.88
1981	2,866,000	2,652,000	1,080.69
1982	2,962,000	2,607,000	1,132.54

Source: Paperboard Packaging Council

had a 90.6 lb share of the 1962 corrugated shipments, and 24.8 lb of folding cartons. In 1982 his share of corrugated was 147.3 lbs, up 62% in the two decades, while his cartons share had dropped to 22.6 lbs—down 9% during a 23% increase in population.

Table F-2: Again, one of the packaging field's most firmly fixed statistics was repeated in 1982: The proportion of scrap from conversion was precisely 19%, as it has been for decades. This brought the year's carton shipment tonnage to 1.7% down from 1981, and 5% below the all-time high volume set in 1979. It also was a bit below the decade's average.

Shipments value, now nearing \$3 billion annually, was 3% above 1981. This is notably less than the overall price inflation, and compares with an average yearly value increase of 12% since 1972 and 10.5% since '62.

The total dollar-value advance of expanding shipments is clearly

F-3 — Grades' Share of Folding Boxboard Production (M Tons and % of Total)

Grades	1960		1970		1978		1979		1980		1981		1982	
Solid Bleached Sulfate	728	25.5%	1,144	37.2%	1,283	37.4%	1,264	36.9%	1,236	37.4%	1,180	36.1%	1,128	35.6%
Clay-Coated Kraft	734	25.7	1,033	33.6	1,181	35.0	1,181	34.8	1,179	35.6	1,271	38.8	380	11.8
Bending Chip	226	7.9	296	9.6	405	12.0	433	12.8	432	13.0	390	11.9	149	4.6
Laminated Bleached	326	11.4	231	7.5	198	5.9	173	5.1	156	4.7	164	5.0	115	3.6
Manila	206	7.2	120	3.9	110	3.3	126	3.7	116	3.5	108	3.2	86	2.1
Patent Coated	208	7.3	114	3.7	90	2.7	74	2.2	71	2.1	60	1.8	43	1.3
All Other	391	13.7	105	3.4	95	2.5	104	3.1	87	2.0	53	1.6	50	1.6
Total	28	1.3	33	1.1	42	1.2	48	1.4	55	1.7	53	1.6	53	100.0
	2,305	100.0	3,075	100.0	3,375	100.0	3,363	100.0	3,311	100.0	3,274	100.0	3,219	100.0

Source: Paperboard Packaging Council

Statistics *continued*

due more to increasing unit-value than to greater tonnage. Thus, shipped volume in 1982 went down 1.7% from '81, up 3.2% from '72, and up 12.5% from '62, while average-ton price rose respectively 3%, 122%, and 210% over those periods.

In fact, some measure of the pervasive inflation in recent years may be seen in that dollar value rise of average-ton carton shipments between 1972 and '82 was more

than five times greater than that between '62 and '72.

Table F-3: The expansion in consumption of high-grade boxboards illustrates the response of designers to successful inroads by competitive materials in applications long held by folding cartons. And that, in turn, has been a major factor in the sharp increase of value per ton, over recent years.

In 1982, the solid bleached sulfate and clay-coated boards together held a 75% share of all ton-

F-4 — Folding Carton Employees & Plant Investment

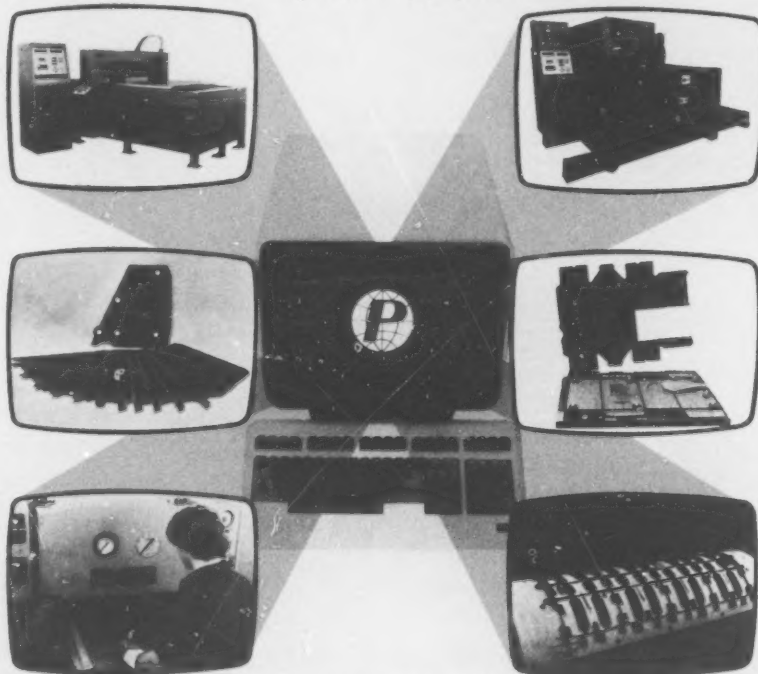
Year	Estimated Number of Employees	Estimated Capital Investment
1952	42,700	\$211,200,000
1962	57,100	373,100,000
1972	74,350	730,191,000
1973	75,820	763,237,000
1974	77,140	797,395,000
1975	78,120	852,322,000
1976	80,100	874,417,000
1977	80,600	944,352,000
1978	80,900	996,291,000
1979	79,400	1,012,350,000
1980	78,100	1,029,450,000
1981	75,600	1,046,978,000
1982	74,300	1,263,500,000

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nage entering into folding carton production, compared with 51% in 1960. However, this resort to "super-appearance" materials has not reversed the decline in carton fortunes, as witness the stagnation of converted tonnage. It may be that high cost of materials is again leading to use of less expensive boards.

Thus, in the relatively cheap materials decade of the '60s, consumed volume of solid bleached went up 57%, and clay-coated 47%. But in the dozen years since 1970, clay-coated tonnage has risen another 25%, while the solid bleached is down to its lowest volume of the period.

No wonder. In 1982, a ton of typical bleached board cost \$373 more than in '72—a 140% increase—while an adequately attractive white-lined recycled board went up only \$190. That differential is likely to carry great weight with box marketers in evaluating the sales appeal of their packages.

Table F-4: Estimated from industry reports, these data indicate that U.S. folding carton plants employed about 1300 fewer people in 1982 than in '81, because of continuing closing of small- and no-profit facilities.

Investment per employee reached \$17,000—up 82% from \$9820 in '72. The average U.S. citizen spent \$12.80 for folding cartons in 1982, up 101% from \$6.37 in '72, up 151% from \$5.09 in '62, and up 187% from \$4.46 in 1952.

The average U.S. folding carton industry employee, including office personnel, represented \$39,730 in converted shipments, up by 122% from \$17,900 in 1972, and by 13% from \$16,695 in 1962.

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Statistics *continued*

Table F-5: The number of producing U.S. folding carton plants and of operating companies decreased in 1982 for the sixth consecutive year, according to our *Official Container Directory* records.

No new carton plants opened during the year, for what appears to be the first time in industry history. A total of 12 plants was closed, and nine individual companies left the scene. Since the 1977 high point of the industry, 73 plants have closed, and 51 companies disbanded.

This reduction in plant numbers is offset, however, by a notable increase in average converting capability. At mid-1982, the industry's capacity for cutting/creasing—a basic indicator of carton operations size—was 67% higher than it had been 10 years earlier. During that decade, investment per average plant went up 79%, and its shipments value 129%.

Composites Gain High-Volume Market Success

Composite Can/Tube/Core Review

Table G: This newest of the paperboard packaging types provides perhaps the best illustration of the versatility of processed fibre products in competing with "natural" materials such as metals and wood.

The composites, designed to resist high stress from within and without, and with high resistance to entry or exit of moisture, gases,

G—Composite Can, Tube and Core Commercial Production

(Millions of dollars, captive production not included)

Estimates by Composite Can and Tube Institute, Washington, D.C.

Year	All Products	Composite Cans	Products other than Cans*
1952	121.4	63.9	57.5
1962	171.8	86.5	85.3
1972	465.5	246.4	219.1
1973	502.2	280.6	221.6
1974	560.4	332.8	227.6
1975	644.3	387.8	256.5
1976	727.5	421.8	305.7
1977	783.3	449.5	334.3
1978	840.4	474.2	366.2
1979	900.0	488.8	411.2
1980	934.1	514.4	419.7
1981	1,021.0	555.3	465.7
1982	1017.2	565.0	452.2

*Includes tubes, cores and miscellaneous specialties.

and odors, have entered successfully in a variety of high-volume end uses.

For that reason, it is misleading to assess the modest sales increase of 1.7% in 1982 from '81 as reflecting a mediocre year, far from the average annual improvement in a total increase of 130% since 1972, of 550% since '62, and of 780% since 1952.

Actually, the minimal increase in '81-82 is a reflection of the virtually complete takeover by composite fibre cans in some applications. A high-volume example is the one-quart motor oil can. Another is the compact composite can for juice concentrates—a package that is produced in tens of billions per year.

Thus, the modest sales expansions of recent years connote a saturation of markets, rather than a slack-off.

Two other major matters concerning the sale of composite fibre cans are also reported by the Composite Can and Tube Institute. One is that the production of these cans in "captive" plants, for the pro-

ducer's own use, is estimated at roughly 10% in addition to the total shown here. Second is that recent years' sales have been greatly affected by the drop in demand for military ammunition containers.

It also may be noted that the composite cans are not thoroughly into some applications that were scarcely to be expected. Among these are the high-volume food and wearing apparel sectors.

In the "other than cans" area, one brilliant success example is a virtual takeover of the textile and related industries applications for reels, rolls, bobbins, spools, mandrels, and the like. These are being made with crush-resistance greater than that of equal-weight steel, to operating accuracies within thousandths of an inch. Overall, these improved composites offer the greatest versatility range of any form in the fibre-product field.

Space limitations necessitate that Paperboard Packaging continue two segments of the Statistical Review (*Fibre Drums and Rigid Boxes*) next month. □

F-5 — Folding Carton Plants, Machines & Capacity

	1952	1962	1972	1978	1979	1980	1981	1982	1983
Plants	599	610	701	743	737	723	711	691	679
Companies	435	466	503	527	517	508	501	485	476
No. Platen Cutters & Creasers	1,839	1,465	1,443	1,514	1,519	1,521	1,502	1,488	1,474
No. Cylinder Cutters and Creasers	1,852	2,085	2,326	2,441	2,442	2,439	2,440	2,432	2,424
No. Blankers — Web fed	186	226	279	339	335	330	319	313	307
No. Blankers — Sheet fed	31	55	390	565	590	608	602	574	556
MM sq in./hr Capacity	8,660.8	12,412.4	18,845.4	29,543.0	31,167.9	31,250.8	31,320.6	30,959.9	30,487.1
MM sq in. Capacity/hr/plant	15.28	30.35	26.88	39.76	42.29	43.22	44.05	44.80	44.90

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OCTOBER 1983 VOLUME 68, NO. 10

On the Cover:

An office worker typing data with a word processor indicates what this issue is mostly about—computers. Our cover story, on software innovations at a Virginia folding carton plant, begins on page 19.



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by Robert Gitlin

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Computers are the key to better communications and more efficient production, from design to delivery.

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Bill Bean knew folding cartons before he learned computers to help his business and his field.

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A trim application program is saving time and putting plant brainpower to better use.

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A Chicago corrugated plant saves \$30,000 a year since it showed the EPA its wash water was clean.

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A business can be a legacy—or it can be buried with you.

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by Fred Sharring

EXCLUSIVE

A recently unveiled flexo folder-gluer does the job once performed by two machines.

EQUIPMENT IN USE

A New England specialty-items plant has wrapped as many as 120 cases a minute.

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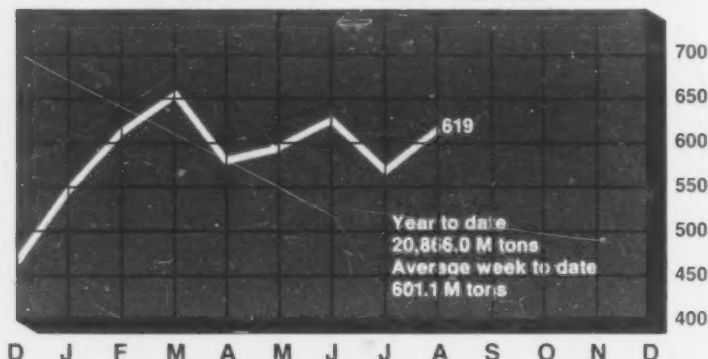
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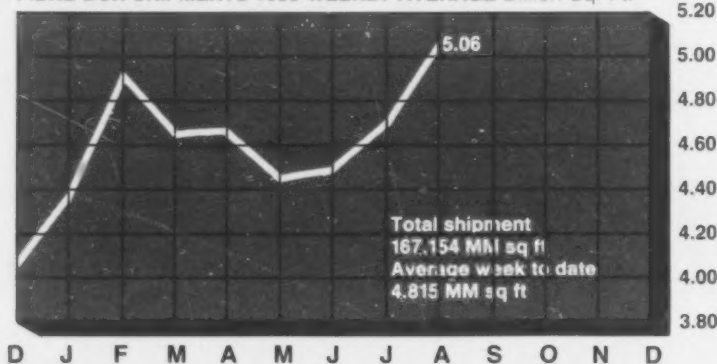
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1 000 Tons



PAPERBOARD MILL OPERATIONS:

The first two-thirds of 1983 ended with an average-week board output 7.4% above the previous year's level, compared with a drop of 9.8% in 1982 from 1981, and a rise of 3.8% in '81 from '80, a drop of 0.7% in '80 from '79, and a rise of 3.1% in 1979 over '78. In short, this trend illustrates the "averaging out" of industry expansion; a year or two of production growth followed by one or two of decrease, and now and then an "average" compensating year. However, an expanding margin of output suggests that the present strength will continue in '83.

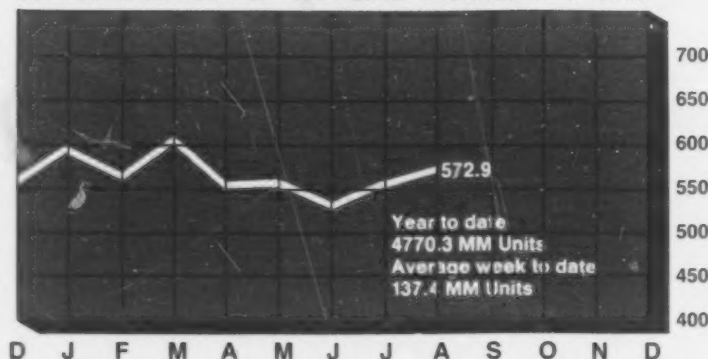
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In August, total board volume of 2742.0 M tons—up 11% from last year—comprised 2039.4 M of containerboards—up 13.7%—and 702.6 M of boxboards—3.9% up—as projected on historical basis from the American Paper Institute's "production by furnish" reports. This depicts the relatively high vigor of containerboard grades in a resurging market, though the boxboards also are well above an average annual advance. A more realistic comparison is with the "normal" year of 1981—August-end volume is up 1% from '81.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

A satisfactory performance during and after what normally is the summer doldrums brought set-up box business into the final third of 1983 with overall billings some 10% ahead of last year, and with each of the National Paperbox & Packaging regions reporting some improvement. However, the geography effect continues to produce variations ranging from well above 100% in some local sectors to deep double-digit drops in others, where recession remains. However, this veteran box form shows an averaging out, over the years, in its regional business fortunes.

Statistical Review concludes with
a close look at Fibre Drums and Rigid Boxes

1983 Is Mixed Bag Of Ups and Downs

by Fred Sharring
Senior Editor
Paperboard Packaging
Editor
Official Board Markets

Fibre Drum Value Grows

Fibre Drum Review

Table H: Gains over 1981 in both total of units produced (9.6%) and value per unit (12.9%) brought the 1982 fibre drum value far above \$400 million—a gain of 24% from '81 and of 268% in the decade.

Some 70% of this decade's improvement in value has come during its second half—since 1977. While a good part of this current-dollar rise reflects inflation, the increase in unit production, 66% since 1972, indicates that research has been productive in design ver-

H—Growth of the Drum Industry

Year	Estimated Million Drums	Estimated Average Price per drum	Estimated Dollar Equivalent
1962	24.5	\$2.01	49,143,000
1962	32.7	2.29	74,888,000
1972	48.1	2.72	130,832,000
1973	50.9	2.83	143,915,000
1974	56.8	2.94	167,149,000
1975	46.6	2.96	137,936,000
1976	50.7	3.17	160,719,000
1977	54.6	3.41	186,190,000
1978	59.0	3.63	226,074,000
1979	64.0	4.21	269,440,000
1980	69.4	4.80	333,120,000
1981	72.9	5.33	388,557,000
1982	79.9	6.02	480,998,000

satility and new applications.

These include wide acceptance in, for example, the growing field of powdered-metal usages, and in advanced features for safe transport of inflammables, explosives,

toxics, and other hazardous materials.

Precise statistics on end uses for fibre drums are not compiled by any official industry agency. However, an informed recent estimate of categories is: chemicals 42%; food and related products 17%; plastic resins 16%; pharmaceuticals 7%; detergents and soaps 6%; abrasives, metal powders, wire, stampings, and machine parts, 6%; rolled materials such as films 2%; and all other products 4%.

Rigid Box Sales Value Stays High, Tonnage Plummets

Rigid Box Review

Tables I-1 and I-2: In 1982, this oldest of the paper box species reached its second-highest sales value, and its lowest production tonnage, in modern history. Total value was down 6.1% from '81 but up 69% from '72. Board tonnage consumed (see Table D-1) was down 5.3% from the year earlier, and by 51% in the 10 years.

It is unlikely that any other packaging form has ever been faced with yielding 85% of its largest single end-use (textiles, apparel, and hosiery) to competitors within a single decade. Fewer could have maintained and expanded total sales value while doing it. But the venerable set-up box seems to have managed that.

Another unique aspect of the rigid box industry is that its output

I-1—Rigid Box Industry Sales

	(Percentage distribution by end use)		
	1962	1972	1982
Textiles, Apparel & Hosiery	23.05%	8.7%	3.3
Department Stores & Specialty Shops	13.58	14.7	5.6
Cosmetics & Soap	6.42	6.7	1.4
Confections	11.47	8.6	16.6
Stationery & Office Supplies	6.21	5.9	17.1
Jewelry & Silverware	5.14	9.2	10.0
Photographic Products & Supplies	3.65	1.5	4.5
Shoes & Leather	2.78	7.2	0.3
Drugs, Chemicals & Pharmaceuticals	4.37	7.7	8.3
Toys & Games	2.92	3.9	2.9
Hardware & Household Supplies	3.18	4.2	7.5
Food & Beverages	1.41	1.0	1.4
Sporting goods	1.06	2.0	0.4
Others & Misc. Customers	14.70	18.7	22.7

is being achieved in a tremendously reduced number of producing plants. At the "high tide" point of some 25 years ago, around 800 separate rigid-box plants were listed in our *Official Container Directory*. These have now been consolidated to a total of 365, producing set-up boxes of greater value than ever before, though consuming much less board in manufacture.

One reason for this expanding vitality has been the increasing economic strength of the remaining producers, who inherit a broader "consumer unit base" in their use of advanced equipment and techniques.

The reduction in tonnage consumption of board may be attributed in large part to wider use of accessory materials, such as E-flute corrugated, plastic inserts, lightweight folding boxboard grades, and the like. These, in turn, have helped to offset increased costs of making and shipping the low-density box products. As industry sales have grown, the average size of company has also increased. The former typical small

I-2—Annual Dollar Sales

Year	Dollar Sales Year to Year (in millions) (% Change)	
1952	259.0	± 0.4
1962	209.5	+ 3.8
1963	314.8	+ 1.7
1964	322.3	+ 2.4
1965	347.3	+ 7.8
1966	385.7	+11.0
1967	394.9	+ 2.4
1968	421.8	+ 6.8
1969	436.5	+ 3.5
1970	433.9	- 0.6
1971	411.4	- 5.2
1972	437.7	+ 6.4
1973	485.0	+10.8
1974	536.9	+10.7
1975	483.2	-10.0
1976	556.1	+15.5
1977	602.3	+ 8.3
1978	653.0	+ 8.4
1979	707.9	+ 8.4
1980	738.3	+ 4.3
1981	787.8	+ 6.7
1982	739.4	- 6.1

producer, inclined to keep business local, has either closed his operation or merged to form larger and better-financed units. At the same time, the great majority of set-up box plants in this country are independently owned and operated—as distinct from the folding carton and corrugated areas, where about 85% of total conversion is in integrated facilities.

Further, rigid-box producers have been aggressive and ingenious in developing many variations on their products, while still meeting demands of new and old markets.

The sequence of end-use distribution in Table I-1 was tabulated originally in the order of highest to lowest percentage of sales. The list now bears little or no resemblance to that order, as new areas of market opportunity were developed, and others declined, because of the newer techniques of retail marketing in "visual display" packaging, such as the transparent plastics. These characteristics of product versatility and producer ingenuity are reflected in the continuing success of the set-up box. □

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